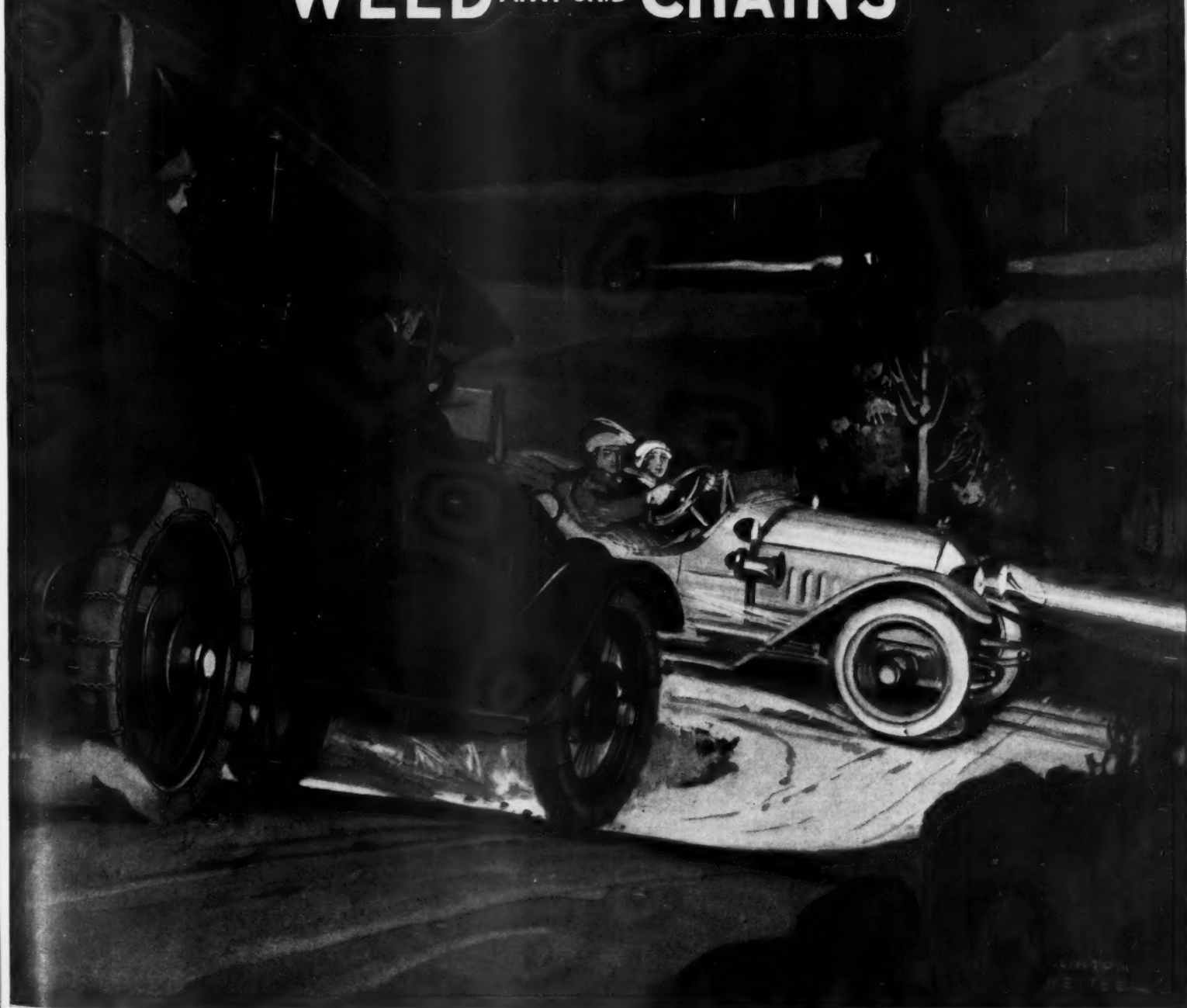


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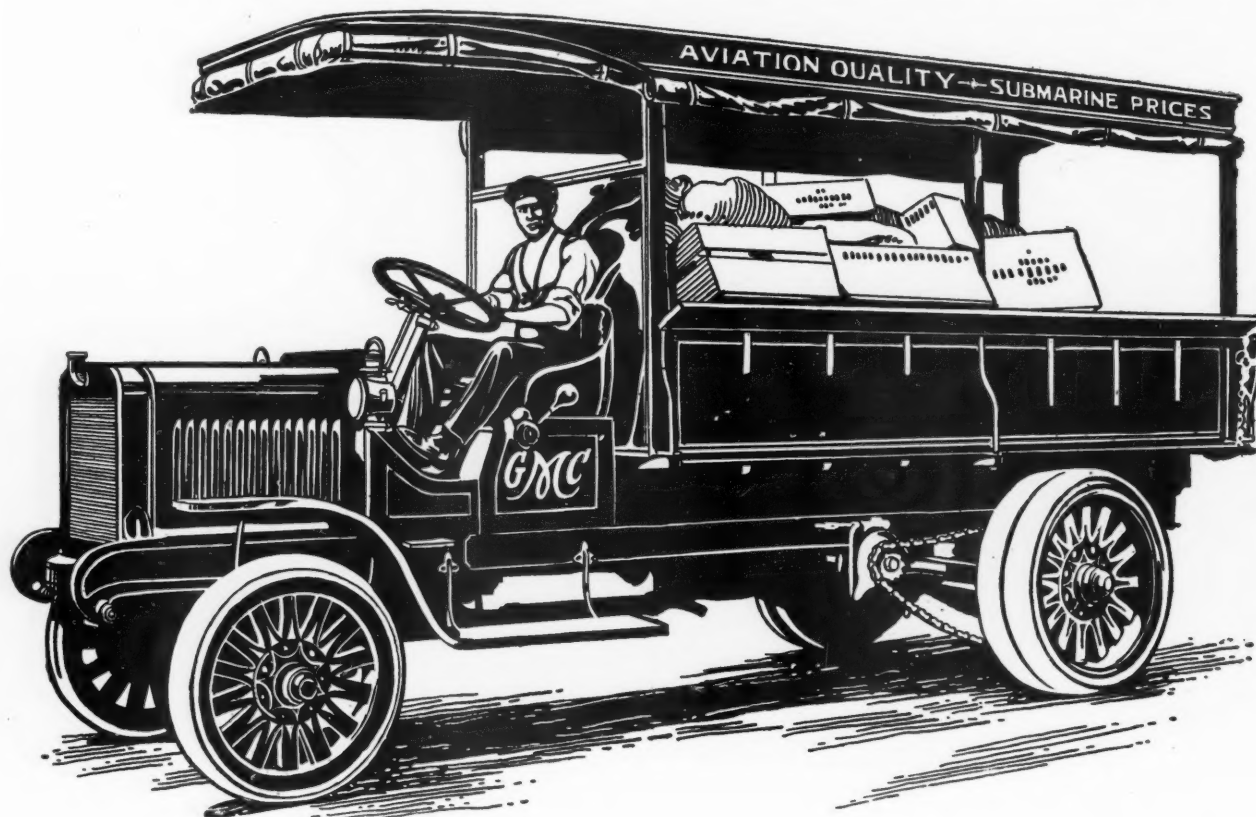
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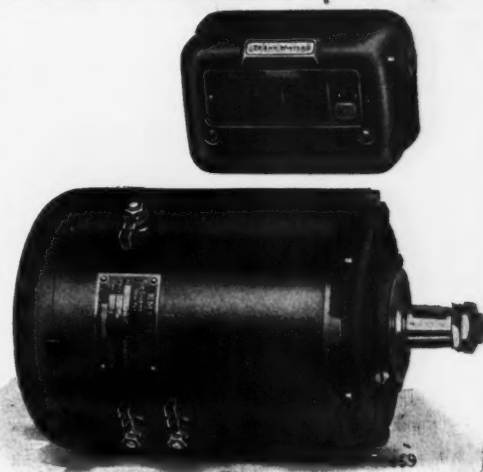
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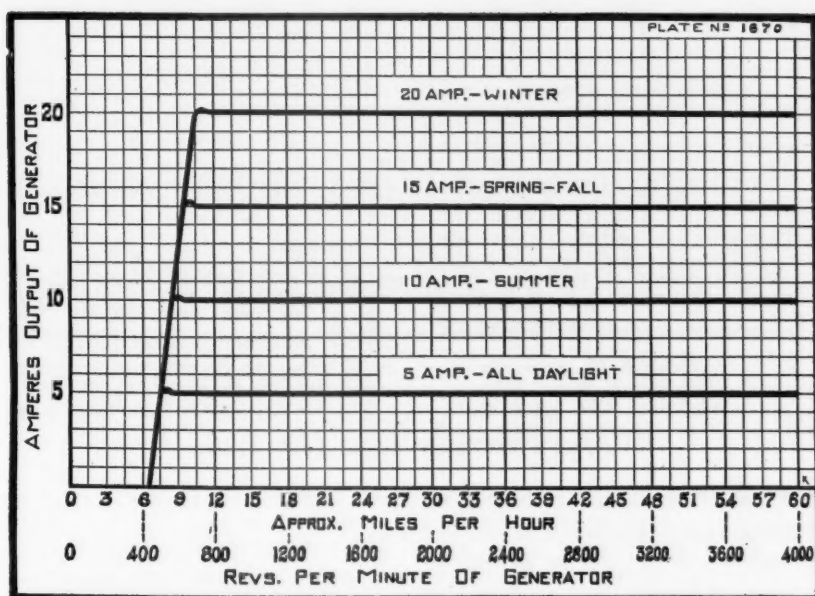
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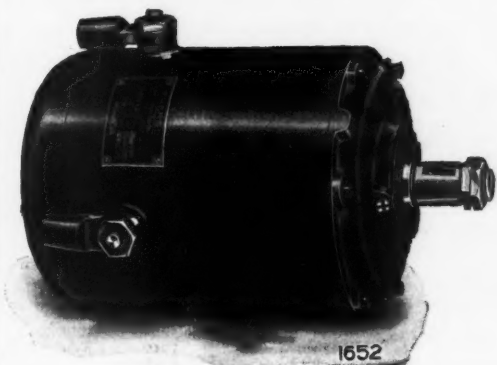
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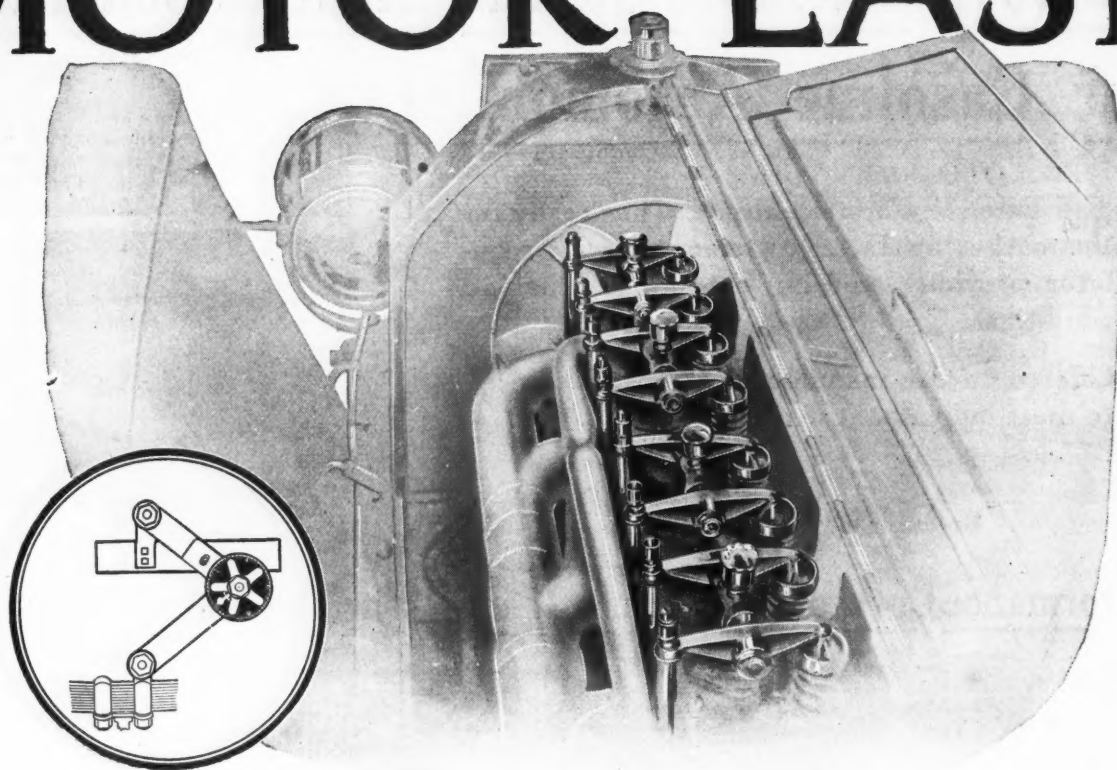
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MARCH 5, 1914

No. 10

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DePalma and Pullen are Victors at Santa Monica

LOS ANGELES, Cal., Feb. 28—Special telegram—Ralph de Palma, a seasoned veteran, and Edwin Pullen, a comparative novice, are the toast of jubilant Los Angeles tonight and the possessors of America's two most historic racing trophies, the Vanderbilt cup and the grand prize.

De Palma, driving the old Schroeder Mercedes that played him false in the 500-mile race at Indianapolis, captured the Vanderbilt cup Thursday. Pullen, in the Mercer, took the grand prize today.

Mercedes Driver Wins Vanderbilt Cup and Mercer Pilot Grand Prize

By C. G. Sinsabaugh

In both races records were broken. In winning the Vanderbilt cup for the second consecutive time and equalling the achievement of Harry Grant in 1909 and 1910, de Palma maintained an average of

75.49 miles an hour for the 295-mile journey, which is the best mark ever made in the classic. Pullen, in today's 403.248-mile event, traveled at a speed of 77.2 miles an hour which shatters Bruce-Brown's mark of 74.45 miles an hour made at Savannah in 1911.

Had Pullen taken a chance or been pushed to win today, he might have smashed the world's road racing record of 78.72 miles an hour established by Teddy Tetzlaff at Santa Monica in 1912, but trou-



BARNEY OLDFIELD, SECOND IN THE VANDERBILT CUP RACE

ble with his front tires and the absence of a dangerous competitor slowed the Mercer driver up and left the Californian secure in possession of the blue ribbon record.

The efforts of the Western Automobile Association to prove to the motoring world that it is possible to promote a successful meet, including the grand prize and Vanderbilt cup races, without relying upon entry fees to insure a profit have worked out to perfection and with the finish of today's classic, the southern Californians are resting upon laurels greatly deserved and honestly won. The two events drew an attendance close to 250,000 for the two days. Each race was stubbornly fought, each victory justly earned. The classics, abandoned in 1913 by Savannah,

have been revived as a result of the untiring work of Leon T. Shettler and his enthusiastic colleagues.

With Pullen's victory in the grand prize today and Barney Oldfield's spectacular challenge of de Palma in the Vanderbilt cup race of Thursday, Mercer captured the honors of the meet. In Thursday's race it was Pullen and Wishart who furnished the early thrills while today Wishart, as long as he was running, burned up the track at the rate of 84 miles an hour. Had it not been for a burned out bearing which eliminated him on the twenty-third lap, he undoubtedly would have beaten the Tetzlaff record by a big margin. Pullen's victory is the first triumph for an American car in the history of the grand prize which had its inception in 1908.

As for the Vanderbilt cup struggle, it was a better race than the grand prize, for the final result was in doubt until the very end. Both de Palma and Oldfield were on the same lap when the checkered flag waved and de Palma had only 1 minute and 20 seconds over his rival. Carlson in a Mason finished third while Earl Cooper, of the Stutz team was fourth. Joerimann's Touraine was running in fifth place at the finish but was flagged.

Pullen Wins Unchallenged

In the grand prize of today it was a different story. True, the race for its first three-quarters was most spectacular with Wishart, de Palma, Anderson, Marquis and Pullen alternating in the lead, but the final test saw all eliminated but Pul-



CARLSON, WHO DROVE MASON TO THIRD PLACE THURSDAY

len. The three who trailed him over the wire—Ball in a Marmon, Taylor in an Alco, and de Palma in the Mercedes—simply limped home, there being more than 40 minutes difference between the times of the first and second cars.

Two accidents occurred, one in the Vanderbilt cup race and the other today. In the former race, Pullen went out at death curve after giving every indication that he would win, and this afternoon Marquis in the Sunbeam met a similar fate just after he had taken the lead and it seemed impossible for any of the other contenders to overtake him. Pullen was not even scratched while Marquis was badly bruised but escaped serious accident in a most miraculous manner.

At the dinner given this evening to the drivers and officials at the Los Angeles Athletic Club, the San Francisco Automobile Dealers' Association made formal application for one of the 1915 classics. It is proposed to split the two races next year, awarding San Francisco one and Los Angeles the other. San Francisco would like to have the Vanderbilt cup event for the fall of 1915 and run it as a Panama-Pacific Exposition attraction, leaving the grand prize for Los Angeles to promote next spring.

De Palma Duplicates 1912 Victory

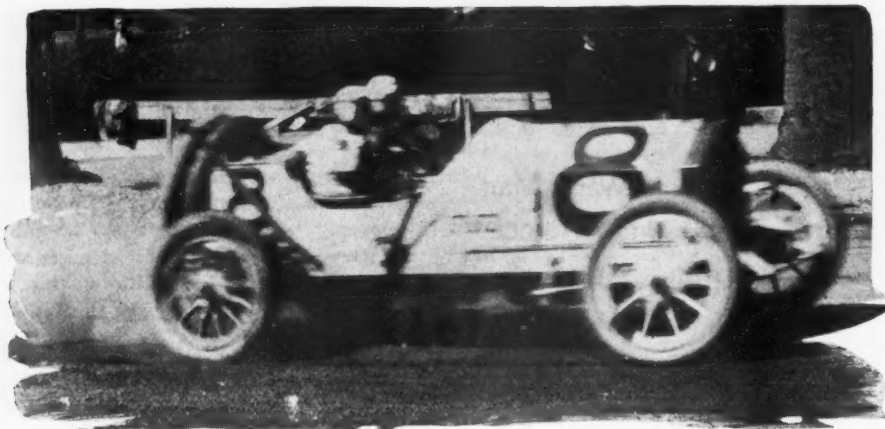
Los Angeles, Cal., Feb. 26—Special telegram—Duplicating the record of Harry Grant and the Alco, Ralph de Palma today recorded his second consecutive victory in the Vanderbilt cup series, taking the classic from a brilliant field of fifteen starters at an average speed of 75.5 miles per hour, which beats the 74.78 miles per hour of Ralph Mulford in the Lozier in the 1911 Vanderbilt.

Inasmuch as de Palma today drove the same Mercedes he had at Milwaukee 2 years ago, it goes without saying that in the next Vanderbilt his mount again will be a Mercedes because the rules of the race provide that the cup becomes the permanent property of the maker who can record three consecutive victories.

De Palma's race was the best the veteran ever drove and probably is the most

SUMMARY OF VANDERBILT CUP RACE

Position	No.	Car and Driver	Time	Miles per hour
1	12	Mercedes, Ralph DePalma.....	3:53:41	75.49
2	7	Mercer, Barney Oldfield.....	3:55:01	75.06
3	10	Mason, William Carlson.....	4:02:39	72.70
4	8	Stutz, Earl Cooper.....	4:04:03	72.28
5	16	Touraine, G. Joerimann.....	Flagged and given fifth money.	
	17	Alco, Janette out on 24th lap with broken axle.		
	3	Stutz, Anderson out on 18th lap with broken driveshaft.		
	15	Marmon, Ball out on 16th lap when he ran out of gasoline.		
	4	Mercer, Pullen out on 13th lap when car blew tire and collided with protective fence.		
	11	Apperson, Goode out on 11th lap with broken oil line.		
	14	Sunbeam, Marquis out on 10th lap with broken rear axle.		
	9	Fiat, Verbeck out on 9th lap with broken oil line and bearing.		
	2	Mercer, Wishart out on 2nd lap with cracked cylinder.		
	1	Isotta, Grant out on 1st lap with broken piston.		
	6	Mason, Lewis out on 1st lap with cracked piston.		



EARL COOPER, THE STUTZ DRIVER, WHO TOOK FOURTH PLACE IN THE VANDERBILT CUP RACE



VANDERBILT CUP CONTENDERS LINED UP AT PITS BEFORE START OF THURSDAY'S RACE

remarkable of all the Vanderbilts, for de Palma never stopped from the time Starter Wagner patted him on the back and sent him away on the 294-mile journey, the eleventh to get away, until the checkered flag told him that he had successfully defended his title to America's greatest motoring classic. Not once did de Palma's tires fail him and the old gray Mercedes carried enough gasoline and oil to make it unnecessary for him to stop.

But de Palma's victory was no walk-over. He had a mighty foe dogging him from the time he gained the lead until the end, waiting to take advantage of any stop he might make. This was Barney Oldfield, driving before his own townsmen and determined if possible to add the Vanderbilt cup to his long list of motoring honors. And Barney came mighty close at that. He lost the race by just 1 minute and 20 seconds and thundered across the tape in his yellow Mercer just 5 seconds after de Palma. The latter, however, had the advantage of starting 1 minute and 15 seconds later than did Oldfield so the finish was not as close as it looked. De Palma played safe the last lap by sliding around at 77 miles an hour while Oldfield hit it up to 82.

Carlson in Mason Third

Two others got the checkered flag—William Carlson in a Mason and Earl Cooper in a Stutz, both Los Angeles pilots. One other car was running at the finish—a Touraine, driven by Joerimann, who was flagged at the end of his thirtieth lap and given fifth place.

De Palma's time for the 294 miles was 3 hours 53 minutes and 41 seconds; Oldfield's, 3:55:01; Carlson's, 4:02:39 and Cooper's, 4:04:03. De Palma's was a consistent race, well planned and well carried out. He kept his laps between 6:22

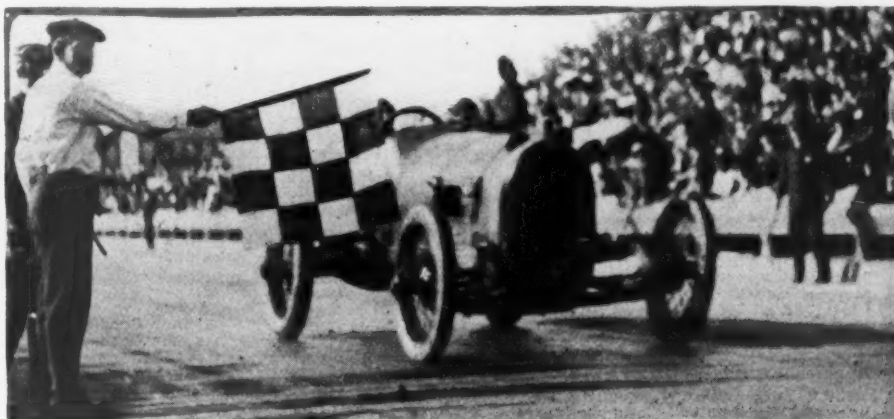
and 6:35 and waited for the early leaders to come back to him. He did not gain the lead until the speed battle was half over and all competition, save that of Oldfield's, killed off.

Oldfield was handicapped by three stops he made at the pits and two others on the course to change tires. The first time Barney stopped in front of the stand it was to take on a spare tire, denoting that he had changed out on the course. It took him

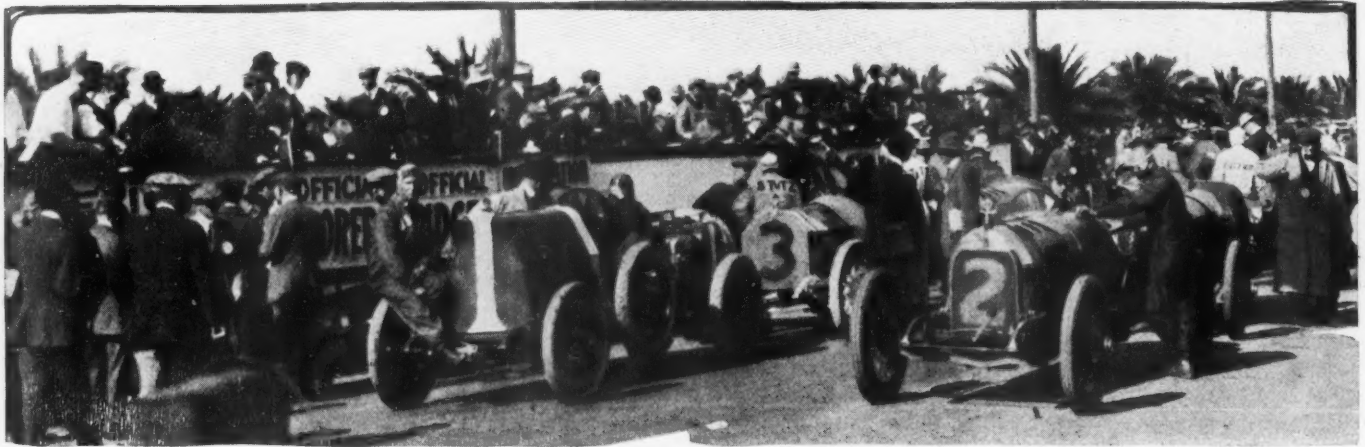
only 45 seconds to do this. When the race was nearly half over, he stopped another minute for gasoline, oil and to take on another spare tire. His last stop was what proved his undoing, for it came when he was only 30 seconds behind the dogged de Palma who was sailing around apparently unconscious that pursuing him was a man who would rather beat the Italian than to take the cup itself. This was when Oldfield was finishing his thirty-first

SUMMARY OF GRAND PRIZE RACE

Position	No.	Car	Driver	Time	Miles per hour
1	4	Mercer	Edwin Pullen	5:13:30	77.2
2	17	Marmon	Guy Ball	5:53:23	68.4
3	6	Alco	B. Taylor	6:08:29	65.66
4	12	Mercedes	Ralph de Palma	6:09:08	65.51
5	9	Mercer	Gordon, running on 30th lap when race was called.		
6	3	Stutz	Anderson, out on the 45th lap.		
7	7	Mercer	Oldfield, out on 37th lap with burned out bearing.		
8	5	Mason	Rickenbacher, out on 34th lap with broken crankshaft.		
9	14	Sunbeam	Marquis, out on 33d lap, turned turtle.		
10	19	Alco	Tony Janette, out on 24th lap with broken cylinder.		
11	2	Mercer	Wishart, out on 23d lap with burned out main bearing.		
12	1	Fiat	Tetzlaff, out on 18th lap with broken connecting rod.		
13	11	Apperson	Goode, out on 18th lap with broken push rod guide.		
14	8	Stutz	Cooper, out on 6th lap with broken valve.		
15	18	Fiat	Verbeck, out on 3d lap with broken valve.		



FINISH OF THE GRAND PRIZE AND VICTORY OF PULLEN IN THE MERCER



CARS WAITING FOR BOMB THAT STARTED GRAND PRIZE RACE

lap and he let 1 minute and 15 seconds get away from him while he was changing a right rear and taking on oil. The stop seemed to put new speed into de Palma, for Oldfield never was able to make up any lost ground, and there remained only four laps more to go. His only chance was for de Palma to have to stop for tires or gasoline but that stop never was made.

Of the other two to finish, Carlson did not report any tire trouble around the course and certainly he made no changes at the pits. He stopped three times in all, the first time for 4 minutes for water and oil, the motor showing signs of heating. On the second stop water and gasoline were taken on. The third stop was for 1 minute for water and oil and came when there remained only 15 minutes of the race to run. Cooper's record at the pits, as kept by Joe Nikrent, shows that one stop was for the purpose of taking on a new tire after changing a casing on the course, using up 38 seconds, while a second stop at two-thirds of the distance cost 1 minute and 22 seconds while oil and gasoline were taken aboard and the front shock absorbers tightened.

Leaders Change Places

The race was marked by many kaleidoscopic changes among the leaders. First was Pullen in the Mercer who seemed destined to inscribe his name in the motoring

hall of fame. Then Gil Anderson took up the running when the Mercer youngster took the count on Death curve and it looked for four laps as if the holder of the Elgin trophy would follow in the footsteps of de Palma who first won the Elgin National and then the Vanderbilt. Gil was running strongly for four laps as a leader, then a broken drive shaft upset his hopes. The car is the same one campaigned all last summer and no changes of drive shaft had been made for this race. Anderson showed plenty of speed while in front.

Pullen Takes the Lead

Pullen led from the second to the end of the thirteenth lap, Anderson from there to the end of the seventeenth, then de Palma assumed command and never was headed, although there was one time—at the end of the twenty-seventh lap—when only 1 second separated the two veterans, de Palma and Oldfield. The next time around de Palma increased this lead to 39 seconds. On the thirtieth lap Oldfield cut this to 30 seconds and was gaining steadily when a nail selected one of the Mercer's tires as a lodging place and forced the stop at the pits which side-tracked Barney.

Oldfield was the fighter throughout the race. While de Palma was running in the back crowd according to schedule, Barney

was up in front forcing the issue. Most of the time in the first half of the race he was running third and when de Palma went into the lead in the eighteenth lap Oldfield followed him and became runner-up.

The attendance today showed that the postponement had no effect, for Chairman Shettler estimates that there were at least 120,000 persons looking on, of which number at least 90 per cent paid for their vantage points. The grand stand was jammed to the limit while all around the course were lined cars and people. The writer, just before time for starting, rode around with Referee Bullard on his inspection trip and was astonished at the sight. Although familiar with Elgin where the parking spaces usually are well filled, the writer found that Santa Monica can discount the Kane county meet on the around-the-course attendance. The crowds were well-handled, too, and not an accident marred the day's sport. For the first time Santa Monica itself gave assistance to the Western Automobile Association in an official way and the result of this co-operation was a well handled meet which cannot help but bring credit to the Pacific coast.

Victory Due to Headwork

DePalma's victory was largely due to the fine judgment and headwork he displayed. Driving a car much slower than those of the majority of his rivals, he was content to nurse the Mercedes along. His patience was rewarded. He saw competitor after competitor, who had reeled off faster laps than he, gradually eliminated. DePalma's fastest lap was turned in 6 minutes and 20 seconds and his slowest, the first, in 6 minutes and 42 seconds. The new bearings of his motor were stiff and excessive speed probably would have been fatal to his chances of winning the Vanderbilt cup for a second time.

Even when Oldfield was within 1 second of him and driving desperately in an effort to pass the Italian, dePalma assumed an "I should worry" attitude and plugged along doggedly as if determined to hold his schedule even if beaten. Running in the ruck for the greater part of the first

EQUIPMENT OF CARS ENTERED IN SANTA MONICA RACES

CAR AND DRIVER	MAGNETO	SPARK PLUGS	CARBURETER	TIRES
Mercedes, de Palma	Bosch	Bosch	Master	Braender
Mercer, Pullen	Bosch	Bosch	Rayfield	Palmer Cord
Mercer, Oldfield	Bosch	Bosch	Master	Braender
Marmon, Ball	Bosch	Bosch	Master	Miller
Mason, Carlson	Bosch	Bosch	Master	Savage & Braender
Alco, Taylor	Bosch	Bosch	Master	Miller
Stutz, Cooper	Bosch	Bosch	Schebler	Braender
Fiat, Verbeck	Bosch	Bosch	Master	Batavia
Mercer, Gordon	Bosch	Bosch	Master	Goodyear
Alco, Janette	Bosch	Pognon	Master	Miller
Sunbeam, Marquis	Bosch	Bosch	Claudel	Palmer Cord
Mason, Rickenbacher	Bosch	Bosch	Schebler	Miller
Marmon, Muth	Bosch	Bosch	Master	Miller
Touraine, Joerimann	Bosch	Bosch	Master	Miller
Mercer, Lewis	Bosch	Bosch	Master	Miller
Fiat, Tetzlaff	Bosch	Bosch	Master	Savage
Isotta, Grant	Bosch	Bosch	Zenith	Palmer Cord
Mercer, Wishart	Bosch	Bosch	Rayfield	Palmer Cord
Stutz, Anderson	Bosch	Bosch	Schebler	Braender
Apperson, Goode	Bosch	Bosch	Master	Kelly-Springfield

All cars were fitted with Boyce motometers. Taylor in the Alco used Valvoline and National oils and Ball in the Marmon used Motorease oil. The other makes of oil used are not known at this time.

half of the race, de Palma made his perserverance an asset and when Pullen first was eliminated and then Anderson, he was in a position to assume the lead and hold it.

In its victorious journey of 294.03 miles, de Palma's Mercedes consumed 32 gallons of gasoline and 7 gallons of oil, an average fuel consumption of 9.18 miles to the gallon.

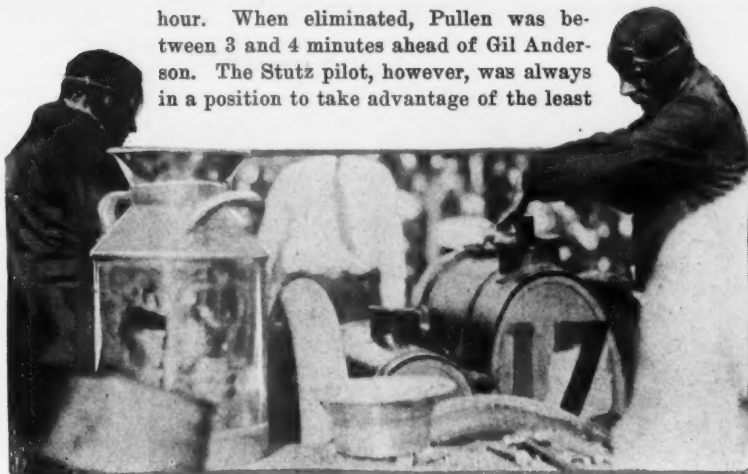
Oldfield's tire luck beat him. In all, Barney figures that he lost at least 8 minutes changing casings. Twice the left front went bad, which is rather unusual, while the right rear also suffered. In addition to that, Oldfield was handicapped the last few laps by a broken plug. He also claims that he discovered after the race that he had a broken piston ring, which made it imperative for him to be cautious to avoid overheating.

At the start of the race, Wishart looked dangerous. Starting second, he was the first to cross the wire. Then he stopped for all time. It developed that the Mercer had a cracked cylinder.

Pullen Skids and Is Out

After Wishart's withdrawal, his teammate, Eddie Pullen, took upon himself the role of pace-maker. He kept in front from the second to the end of the thirteenth lap when there came a skid and smashup on Death turn which changed Pullen from a contender to a spectator. While he was running, Pullen was moving. To him is credited the fastest lap of the race, 6 minutes and 3 seconds on his fourth circuit of the course, which is equal to 83.5 miles an

hour. When eliminated, Pullen was between 3 and 4 minutes ahead of Gil Anderson. The Stutz pilot, however, was always in a position to take advantage of the least



BALL'S MARMON STOPS AT PITS FOR FUEL JUST BEFORE FINISH OF GRAND PRIZE

mishap to Pullen's Mercer, which he had been hanging to since early in the speed battle.

Anderson's reign as pace-maker was not for long. Although he remained in front for only four laps, it is a certainty that had it not been for the broken driveshaft the Indianapolis boy would have made dePalma fight much harder for his victory than he did.

As long as Pullen led, dePalma was never better than fifth. With the Mercer out, Ralph crept up, passed Oldfield, who had clung tenaciously to the leaders, and went into second place. Barney never overtook dePalma again, although late in the race he was but 1 second behind.

Carlson's race was most consistent. Running fifth at the end of the eighth lap, he went into fourth place for four laps and after that was never worse than third except on one circuit, when he slipped back a notch.

Pullen's elimination gave Earl Cooper

his chance to finish inside of the money, the 1913 American road racing champion moving up to fourth place when the Mercer was permanently docked and holding that position until the finish.

Pullen is Victor

Los Angeles, Cal., Feb. 28 — Special telegram — Ed Pullen, former mechanic of Spencer Wishart, who achieved his first victory at Tacoma last year, today won the honor of piloting the first American car that ever won the grand prize. At the wheel of the same Mercer which made such a powerful bid for the Van-

derbilt cup Thursday, Pullen finished first in the 403.24-mile classic at an average speed of 77.2 miles per hour which beats Bruce-Brown's previous best record made at Savannah.

Pullen's time was 5 hours, 13 minutes and 30 seconds while the second car, the old Marmon, which Patschke drove at Savannah 2 years ago, ran second in 5 hours, 53 minutes and 23 seconds, an average of 68.4 miles an hour. Taylor in an Alco was third in 6 hours, 8 minutes and 29 seconds, averaging 65.6 miles an hour, while de Palma, limping in on three cylinders, took fourth and last money in 6 hours, 9 minutes and 8 seconds. The only other car that was running at the finish was Gordon's Mercer, a private entry which had completed forty laps when Referee Wagner stopped the race. All the other thirteen cars had been eliminated for one reason or another. In fact the grand prize of 1914 was most gruelling.

It was a most spectacular race, was this



RALPH DE PALMA GIVING CHASE TO CARLSON JUST BEFORE SLOWING DOWN TO TAKE DEATH CURVE



VANDERBILT CUP RACE DRIVERS LINE UP FOR PHOTOGRAPH BEFORE STARTING 295-MILE EVENT

1914 grand prize, with four different drivers, each of whom looked a winner when he was in front, alternating in the role of pacemaker. At the start Spencer Wishart shot to the front and set a sizzling pace for twenty-two of the thirty-eight laps. He averaged 84.4 miles an hour for the first fifteen circuits of the course and at the end of the twentieth lap had dropped to 83.6 miles an hour. Even then there was no indication that he would let up in his dizzy flight but in the twenty-third lap a burned-out bearing stopped Wishart for all time, and the once-feared Mercer thundered a menacing challenge no longer.

De Palma's Lead Not For Long

This gave De Palma his chance and the man who had twice won the Vanderbilt cup shot to the front and remained there until the end of the twenty-ninth lap although he dropped the average speed below 80 miles an hour. Then a broken intake valve forced De Palma, who had gone through the Vanderbilt cup race without a stop and who was on his thirtieth lap in the grand prize before trouble overtook him, to halt at his pit. It was serious trouble. Twenty minutes were lost while De Palma worked on the valve. Finally he had to go on in a crippled condition, running on three cylinders for the rest of the race, yet being able to capture fourth money. Had he had an extra intake valve he would have been a sure second and perhaps might have been hailed as victor instead of Pullen.

With De Palma at the pit, Marquis in

the English Sunbeam, which had not made a stop up to this time, had a clear field and went to the front. The easy manner in which he slid around made him look more than dangerous and it seemed that the race was all over, except for the shouting, but Marquis stayed in front only for three laps. He was more than 47 minutes ahead of the limping Mercedes when he met with his accident on the turn after leaving the grandstand. Some of the bystanders say that the accident was caused by Marquis taking a hand off the steering wheel to wave at the crowd. At any rate the Sunbeam turned over three times, then landed against a 7-foot fence with driver and helper buried under the debris. That Marquis and his mechanic were not killed outright was nothing short of a marvel, but both escaped although injuries necessitated their removal to the hospital. It was first reported that Marquis was

killed but later the announcement was made that not a bone was broken and that he would recover. The car was practically wrecked.

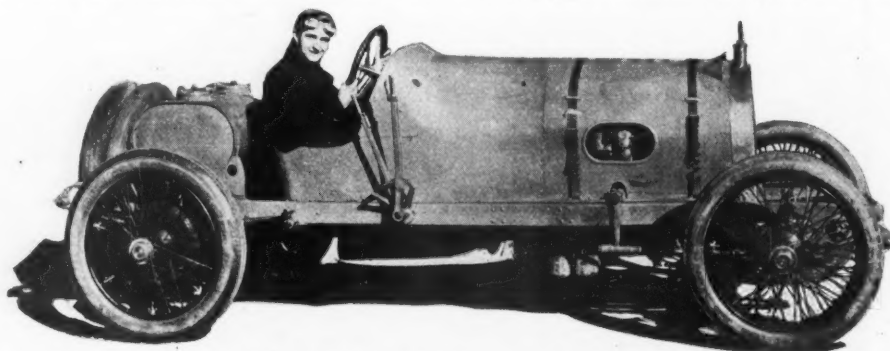
Pullen in Commanding Position

Pullen had been running along in second and third place most of the time and when Marquis went out, he was in a position to take advantage of De Palma's weakness and assume the lead which he never relinquished. The only contender to fight him was Gil Anderson in a Stutz who had been challenging the pacemaker all the way from the time the starting bomb sounded. Anderson ran second to Pullen for eight laps, then stopped unexpectedly on the back stretch and was seen no more. No reason for his withdrawal was given.

Anderson's elimination in the forty-fourth lap robbed the race of its last semblance of competition for Ball and Taylor, who finished second and third respectively, never were in the fight. It was a case of two cripples limping home. De Palma was in the same predicament, although earlier he had been a most important factor and feared contender.

Teddy Tetzlaff had been counted upon as a possible contender but his giant Fiat could not stand the grueling grind, and went out with a broken connecting rod that punched a hole in the bottom of the crankcase after the native son and idol had gone seventeen laps. At the time of his withdrawal he was running in third place. Tetzlaff, however, can find some consolation in the fact that he turned the fastest lap of the race—5 minutes and 49 seconds or 86.6 miles an hour—on his twelfth circuit of the course. On this same round Wishart was clocked in 5 minutes and 54 seconds, the second fastest lap of the race.

Pullen cannot claim a world's record, but he has the satisfaction of knowing that he covered thirty-five laps faster than did Tetzlaff when he established his mark at 78.72 miles an hour. For this distance



ED PULLEN AND THE TRIUMPHANT MERCER. A FEATURE IS THE HANDHOLE IN THE HOOD THROUGH WHICH RAYFIELD CARBURETER SHOWS

RELATIVE STANDING AND AVERAGE MILES PER HOUR OF LEADERS IN THE GRAND PRIZE ROAD RACE

Lap 5	Lap 10	Lap 15	Lap 20	Lap 30	Lap 35	Lap 40	Lap 45	Lap 48
Wishart 83.2	Wishart 84.4	Wishart 84.6	Wishart 89.0	Marquis 79.5	Pullen 79.0	Pullen 77.3	Pullen 77.7	Pullen 77.2
Oldfield 80.6	Pullen 81.5	Pullen 82.0	Pullen 79.8	De Palma 73.2	Oldfield 77.0	Anderson 76.7	Ball 68.3	Ball 68.4
Pullen 79.8	Anderson 80.2	Tetzlaff 80.6	De Palma 79.4	Anderson 79.0	Anderson 76.6	Ball 67.9	Taylor 65.1	Taylor 65.6
Tetzlaff 79.3	De Palma 78.8	Anderson 80.0	Marquis 79.2	Pullen 78.4	De Palma 71.4	Taylor 66.4	De Palma 65.0	De Palma 65.5
Anderson 78.5	Tetzlaff 78.3	Oldfield 79.4	Anderson 79.0	Oldfield 77.3	Ball 62.2	De Palma 62.7		

Pullen averaged 72.7 miles an hour. Tires caused him to slow down after this. In all the grand prize winner made eight stops. Four of these were for tire changes on the course, and the other four were halts at the pit to take on spares. On his first stop at the pits, he improved his opportunity by taking on gasoline and oil, the only time during the race.

Ball's Marmon had its troubles bunched. In the nineteenth lap he was at the pits for 19 minutes during which time Ball put a new float in his carbureter, changed three plugs, took on fuel and water, adjusted his magneto mounting and plugged up a sand hole in his water pump casting. Another time he used up 2 minutes changing a tire and a third stop for water and gas consumed 2 more precious minutes.

Taylor's Alco made four stops in all, three for tire changes and a fourth to take on supplies. Most of de Palma's troubles was caused by the valve. If this could have been avoided, he might have been returned a winner.

Carlson, who finished third in the Vanderbilt cup race of Thursday, and was to drive the Mason today, did not start, breaking a crankshaft while going to the course.

The Pendelton system of scoring was most interesting, for the progress of the cars around the course could be followed, for as each mile was passed a telephone message advised Pendelton who promptly posted the result on the board by means of slides. This kept the spectators fully informed as to the standing of the cars.

Equipment of Cars Makes Showing

EQUIPMENT was responsible to some extent for the winning of the Vanderbilt and grand prize races and were it not for the showing made by the tires, magnetos and carbureters on the cars, the fast time at the two meets probably would not have reached record-breaking figures. Pullen in a Mercer, with a Rayfield carbureter, and Bosch magneto and spark plugs, romped home the winner in the grand prize with a new record and were it not for the perfect operation of the motor accessories and tires, the figure of 77.2 miles per hour might have been considerably less. In the Vanderbilt, de Palma, the winner in a Mercedes, used Bosch spark plugs, a Bosch magneto and a Master carbureter. The latter accessory was used on no less than twelve of the cars competing in the races and showed that it is capable of standing severe punishment, finishing one, two, three in Thursday's event.

Rayfield Carbureter in Grand Prize

Rayfield-equipped cars have won the grand prize twice in succession, the other victory being Bragg's win at Milwaukee in 1912. A car with this equipment carried off the honors of the Vanderbilt cup, when the Lozier won at Savannah. The Santa Monica races were the first time the Master carbureters have had a chance to show but they more than made up for previous obscurity in last week's record.

Not a car in either days' racing was put out of the race because of motor accessory trouble, which is a remarkable showing, considering the performance at some of the old-time race meets. And the tires showed up exceedingly well. It is stated often that "a race is won by the tires" which contains much truth. Had de Palma made stops for tire changes he might have lost the Vanderbilt. He had Braenders, an unheard of make for racing, until Mulford made his remarkable 500-mile non-stop run at Indianapolis last May. This make of tire has been used since that time in most of the speed contests in America.

The grand prize winner used the Palmer cord tire. The second and third men to finish in the Saturday's event, Ball in the Marmon, and Taylor in the Alco, used Miller tires. Savage tires took third place in the Vanderbilt on the wheels of Carlson's Mason, and were used by a non-winner, Tetzlaff in a Fiat.

Forgetting the winners, every car which competed in the Vanderbilt and grand prize was equipped with Bosch magneto and spark plugs, with the exception of Janette, in the Alco, who used a Bosch magneto and Pognon plugs. Three cars, which were put out of the race before the end, were equipped with Schebler carbureters, but it was not carbureter trouble which made them quit. One car, the Isotta, with Grant up, used a Zenith and one entry used a foreign make, the Sunbeam, which was Claudel-equipped. Five cars used Braender tires and seven Miller tires.

On a previous page in this issue a tabulation is printed showing the equipment used by all of the cars in both races. All the cars were equipped with Boyce motometers for gauging engine heat.

Master Carbureter Described

The Master carbureter which was used on twelve of the cars which competed in the Vanderbilt cup and grand prize races held last week, is featured by a rotary throttle; which, it is claimed, correctly proportions the fuel and air. This type of throttle does away with the conventional butterfly type. The rotary throttle uncovers holes in what is known as a fuel distributor, the uncovering being proportional to the throttle opening.

The design of the Master, which is illustrated herewith, is such as to offer the minimum of resistance to the passage of the mixture and by thoroughly mixing both fuel and air, the carbureter, it is stated, is able to handle the heavier grades of gasoline now on the market.

The fuel distributor which extends across the entire passageway, has a series of very small holes which are uncovered gradually



MASTER CARBURETER FEATURED AT SANTA MONICA

by the rotary throttle. The holes are protected against clogging by a fine screen and should any dirt pass through the screen it will pass through the distributor. All Master carbureters are fitted with hot air attachments to the air intake as shown on this page. The 1½-inch for handling gasoline sells for \$35 while the same size for kerosene and heavier fuels is listed at \$40. It is made by the Master Carbureter Co., Los Angeles, Cal.

NEW CAR FOR PACIFIC COAST

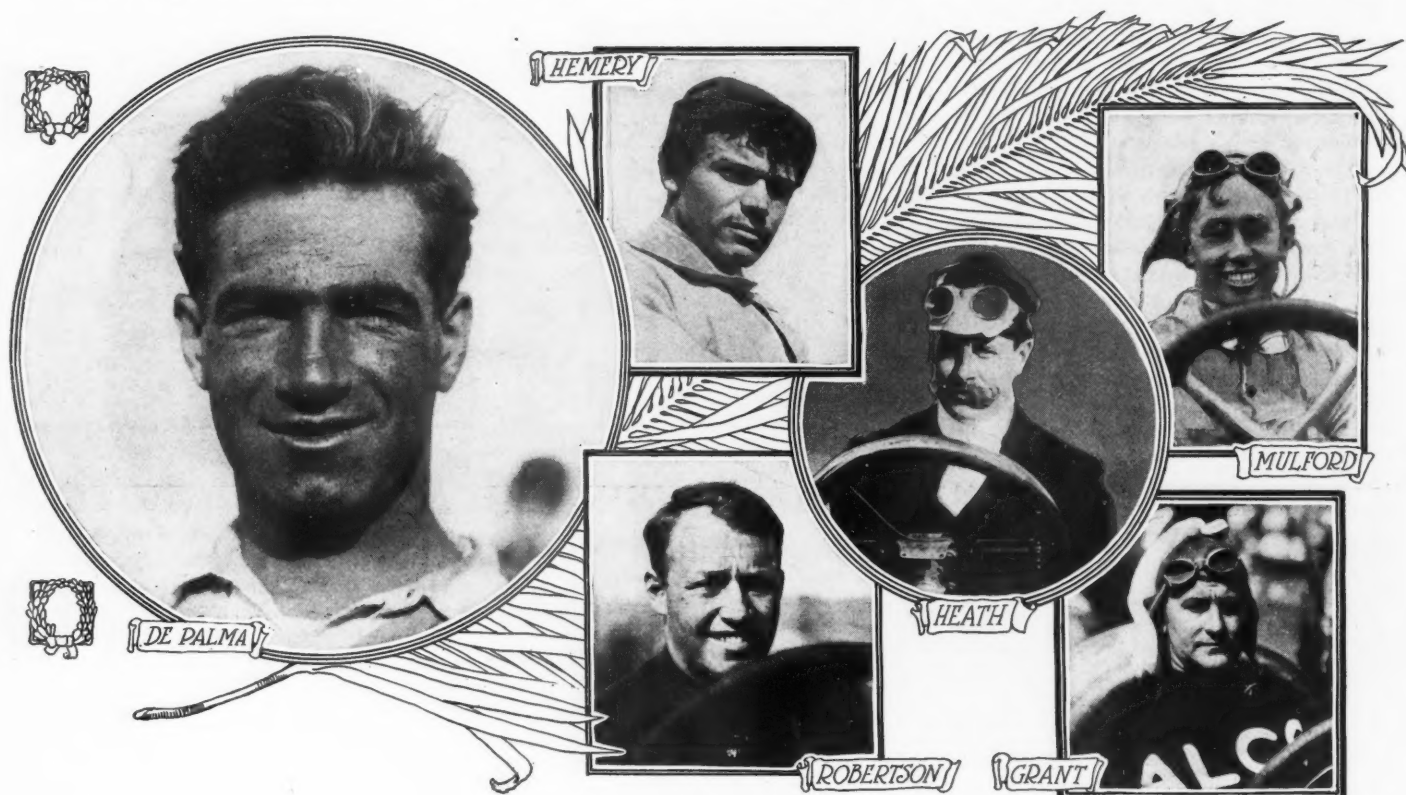
Seattle, Wash., Feb. 28—The Ajax, a distinctly new car and one that will claim Seattle at its home, has been announced by the Ajax Motors Co., which is headed by Seattle capital and incorporated in the state of Arizona. Behind the company are George Parker, Frank L. Parker and Charles L. Parker. They will erect a factory within the city limits and will be in a position to make deliveries by October 1, 1914. The first year's output will be about 100 cars.

The Ajax is a six-cylinder car with a bore of 4½ by 5½ cylinders. It will be produced in roadster, phaeton and touring models. The entire car with the exception of forgings, frames and wheels will be manufactured in Seattle. Gear blanks, axles and crankshafts will be obtained rough-forged from Krupp's in Germany and will be machined and finished in the Ajax shops in Seattle. The company will have its own foundries for iron, aluminum and bronze parts.

It will be built in two styles, one with a piston-valve engine and the other with a poppet-valve motor. One feature that is peculiar to this power plant is that it can be changed from piston-valve design to poppet valve, and vice versa, at comparatively small expense. The cylinders of the test model, which has been run several thousand miles and which will be the model for the machines to be made, are cast in pairs, and have exceptionally large waterjackets and valves.

Bodies will consist of roadster, four and five-passenger and seven-passenger types. Limousines also will be offered. The wheelbase of the roadster will be 120 inches; touring 133 and 136 inches.

History of the Two American Motor Car Speed Classics



Seven winners of the Vanderbilt cup—George Heath, 1904; Victor Hemery, 1905; George Robertson, 1908; Harry Grant, 1909 and 1910; Ralph Mulford, 1911 and Ralph dePalma, 1912 and 1914

IN THE gray mist of a memorable October morning dawn 10 years ago, fifty thousand residents of New York and its environs experienced a new variety of thrill, such a thrill as shot up and down the common spine of the Pacific coast sun-worshippers at Santa Monica last week.

Birth of a New Classic

The expectant fifty thousand, which had gathered on Long Island during the night and early morning to witness an alien sort of sporting event, heard the challenging roar of eighteen motors, saw eighteen exhausts belch forth impetuous flame. The barking motors, the coughing exhausts were announcing the birth of a new classic in a sport equally as new to this country.

Five and a half hours later on the same memorable October morning, the fifty thousand had seen the first Vanderbilt cup race run and won, had hailed George Heath, an American expatriate, and the French Panhard as victors in a contest that created in the American people an appetite for speed and sensations that remains insatiable to this day.

The running of the first contest for the Vanderbilt cup in 1904 marked the beginning of road racing in this country. Previous to 1904 contests for motor cars were confined to a few dirt-track events, beach meets and reliability runs. The latter were scheduled as road races but were road races in name only, as they were tests of the endurance and not of the

By J. C. Burton

speed of the competing machines. The first race for the Vanderbilt cup was a complete realization of the aims of its distinguished patron, William K. Vanderbilt, who, filled with enthusiasm over a new sport in which he had gained prominence by driving a mile in 39 seconds on Daytona beach, offered a trophy for an international struggle, that motor car road racing, which had met with much favor in France, might be popularized in the United States.

The Vanderbilt cup, which has been competed for nine times in a decade, is the sport's most historic trophy. Three lives have been lost in the quest of it, millions of dollars spent in efforts to win it. France has captured it thrice and America has successfully defended it six times. The nine struggles for it have attracted thousands of sportsmen to New York, Savannah, Milwaukee and Santa Monica, the four cities where the classic has been promoted. Up until this year only one driver, Harry Grant, had been twice favored of the gods of speed in the nerve-racking drives for it, the former pilot of the Alco winning the cup in 1909 and 1910.

First Field Mostly Foreign

The first race attracted but four American entries—two Pope-Toledos, a Packard and a Simplex—and the supremacy of the fourteen foreign cars, driven by the speed potentates of the old world, was not

keenly disputed. Heath, the winner, covered the 284 miles at an average speed of 52.2 miles an hour and finished almost 2 minutes ahead of the Clément-Bayard, the only other car to get the checkered flag.

France also was triumphant in the second contest, held on the Long Island course in the fall of 1905, Victor Hemery, driving a Darracq, winning the event. Heath, the victor of the previous year, was second with Tracy's Locomobile trailing in third place. Hemery averaged 61.49 miles an hour for the 283 miles.

France Wins for Third Time

There was joy in Paris after the running of the 1906 race for France was victorious for a third time, Louis Wagner duplicating the 1905 feat of Hemery and piloting the Darracq to victory. The distance was 297 miles and the average speed of the winner 61.43 miles an hour. Lancia, in a Fiat, was second and Duray, at the wheel of a Lorraine-Dietrich, third.

Because of the failure of the promoters to obtain troops to guard the course, the race was abandoned in 1907 but the following year Long Island was again the scene of a Vanderbilt cup contest. French supremacy was successfully challenged and for the first time an American driver and an American car took the trophy, George Robertson, in a Locomobile, winning at an average speed of 64.38 miles an hour. George Lytle, with an Isotta, was second.

With Robertson's victory, the American driver ceased to be a trailing challenger and went to the front as a repeating champion. Fate decreed that the invaders from France, Germany and Italy were never to seize the Vanderbilt cup with alien hands again. The European car suddenly lost its menacing note. With the supremacy of the American driver came the supremacy of the American car.

Harry Grant and the Alco rose to the top of fame's crest in 1909, this combination of resourceful driver and efficient machine proving invincible in the fifth contest for the Vanderbilt cup which was run over the Long Island course. Grant covered 278.08 miles at an average speed of 62.77 miles an hour.

Last Race on Long Island

The 1910 contest, the red Vanderbilt of motoring history, was the sixth and final race on Long Island. Again Grant and the Alco were unbeatable, although Joe Dawson, then "the kid" of the Marmou team, proved a determined and dangerous contender, chasing Grant from starting bomb to checkered flag and finishing a close second.

The 1910 contest was marred by several fatalities and accidents, caused by spectators, whom the local constabulary were powerless to check, swarming on the course, and the American Automobile Association, unable to secure state troops to guard the roads, decided to abandon Long Island as a scene of Vanderbilt cup competition.

In 1911 the race was transferred to Savannah, Ga., where Ralph Mulford, then a member of the Lozier team, was crowned with the laurels of victory and established a new Vanderbilt cup record of 74.07 miles an hour. Savannah again was awarded

VANDERBILT CUP RACE HISTORY IN TABLOID FORM							
Year.	Winner.	Distance.	M. P. H.	No	No		
	Car and Driver.	miles.		starters.	finishers.	Place.	
1904	Panhard, Heath.....	284.4	52.23	18	2	Long	Island
1905	Darracq, Hemery.....	283	61.05	19	4	Long	Island
1906	Darracq, Wagner.....	297.1	61.43	17	5	Long	Island
1907	No race held because promoters could not get troops to guard course.						
1908	Locomobile, Robertson.....	258.06	64.38	17	2	Long	Island
1909	Alco, Grant.....	278.08	62.77	15	2	Long	Island
1910	Alco, Grant.....	278.08	65.18	30	10	Long	Island
1911	Lozier, Mulford.....	291.38	74.07	14	6	Savannah	
1912	Mercedes, DePalma.....	299.54	68.97	8	5	Milwaukee	
1913	Awarded to Savannah but called off because of lack of entries.						
RESUME OF PAST STRUGGLES FOR THE GRAND PRIZE							
1908	Fiat, Wagner.....	402.05	65.08	20	9	Savannah	
1909	No race held.						
1910	Benz, Bruce-Brown.....	415.2	70.55	15	6	Savannah	
1911	Fiat, Bruce-Brown.....	411.36	74.45	16	6	Savannah	
1912	Fiat, Bragg.....	410.60	69.3	12	4	Milwaukee	
1913	Awarded to Savannah but called off on account of lack of entries.						

the contest in 1912 but the southern promoters surrendered the sanction when state authorities refused to furnish troops for patrol duty. Milwaukee then bid for the race which was awarded to the cream city. Only eight cars contested. Ralph de Palma, after a spectacular struggle with Hughie Hughes, scored a hard-fought victory.

Last year Savannah was awarded the race for a third time and for a second time abandoned its promotion, the promoters claiming that they could not get sufficient entries to make the contest either a financial or sporting success.

Although lacking the tradition of the Vanderbilt cup, the grand prize trophy is just as highly prized. It is the Automobile Club of America's contribution to road racing in this country. It was first hung up for competition in 1908, when the Automobile Club of America, jealous of the prestige of the American Automobile Association, decided to run a race at Savannah as a rival attraction to the Vanderbilt cup event.

Wagner Takes First Race

Twenty cars competed in the first race, a strenuous 402-mile struggle, in which Louis Wagner of France, driving a Fiat, humbled the American defenders. His average speed was 65.08 miles an hour.

Following this race, the American Automobile Association and the Auto-

motive Club of America declared a truce. It was decided that the Vanderbilt cup should be emblematic of the national and the grand prize of the international championship. The second grand prize contest was scheduled to be run in connection with the Vanderbilt cup event on Long

Island, but, following the accidents that marred the latter contest in 1910, it was transferred to Savannah.

Dramatic Finish of 1910 Event

The grand prize contest of 1910 proved the most spectacular road race ever run in this country, furnishing the most dramatic finish in the history of the sport. The narrow margin of 1.42 seconds gave David Bruce-Brown the victory over Victor Hemery. The giant Benz, which carried Bruce-Brown across the line, averaged 70.55 miles an hour. Bruce-Brown changed his mount from a Benz to a Fiat before the third grand prize contest, a switch that made him all the more invincible, for he repeated his feat of 1910 in the 1911 race and increased his average speed to 74.45 miles an hour.

In 1912 the grand prize race was awarded to Milwaukee and run in conjunction with the Vanderbilt cup event. Caleb Bragg, after announcing he would not start when Bruce-Brown was killed in practice, changed his mind at the eleventh hour, appeared at the line in his Fiat and captured the trophy.



Winners of the grand prize in races previous to 1914—Louis Wagner, 1908; David Bruce-Brown, 1910 and 1911; Caleb Bragg, 1912. Wagner also has the distinction of winning the Vanderbilt cup contest of 1906

Want Herreshoff Declared Bankrupt

Trustees of Detroit Company Make Sensational Charges Against Present Management

DETROIT, Mich., March 2—A number of the creditors of the Herreshoff Motor Co. have gotten together in this city and filed a petition in involuntary bankruptcy against the concern, a custodian being appointed who is now in possession of the property of the Herreshoff concern through a representative. These creditors have designated a committee consisting of H. W. Patton, Detroit Body Co.; J. H. French, Michigan Stamping Co.; and J. L. Dryden, Long Mfg. Co., for the purpose of soliciting all claims of all creditors to vote in favor of the election of the Security Trust Co. as trustee at the first meeting of the creditors.

The Lycoming Foundry and Machine Co., Williamsport, Pa., through a representative, has managed the Herreshoff company since last fall, this concern furnishing the Herreshoff motors and being the largest creditor, its claims amounting to more than a majority of the Herreshoff's total indebtedness. But under this management, the Herreshoff concern is said to have gone from bad to worse and the action taken is the outgrowth of this condition. Rather sensational charges have been preferred against the Lycoming company by the creditors' committee.

In requesting the power of attorney from all creditors, the committee makes the following statement:

"In the fall of 1913, the Herreshoff Motor Co. found itself in financial difficulties, and called together a number of its larger creditors and asked an extension of time. The situation was canvassed and it was decided to grant such extension provided the creditors could be represented on the board of directors, and provided further, that the Lycoming Foundry and Machine Co., which had built the engines for the Herreshoff Motor Co. would send a representative to Detroit to stay on the job and see that proper motors were secured and installed in the cars to be shipped after that date. In furtherance of this proposition, notes were sent out which were accepted by most of the creditors, and particularly the larger creditors accepted the notes on the understanding that no interest was to be paid to anyone. The concern continued since under the management of the Lycoming company's representative and instead of conditions becoming better, they became worse."

It is further claimed that the Lycoming company has been taking interest on its accounts and has also applied upwards of \$6,000 upon its claim, while the rest have received nothing.

It is also said that the Lycoming company failed to furnish the proper character and class of motors, and the loss

sustained by the Herreshoff company by reason of the rejection of its cars on this account is pointed out as being the real reason for the concern's financial difficulties. Just what merit there is to these contentions will have to be decided by the courts.

Although the Lycoming company is in the majority as regards amount of claims, the creditors' committee explains that in numbers, if the other creditors get together, they will control the majority which will result in the election of and appointment by the court of one or the other of the trust companies here in Detroit, or some other third person, as trustee, so that the creditors can have the benefit of an investigation of these alleged conditions.

MAIS RESCUERS TO LOSE MONEY

Indianapolis, Ind., March 2—Stockholders of the old Mais Motor Co., who subscribed to a fund of \$75,000 in an effort to save the company from a receivership, will not receive any part of this money back, according to a decision just handed down by the Indiana appellate court. The decision was given on an appeal from the lower court's ruling as to how assets should be distributed by the receiver. The lower court's decision was affirmed by the higher court.

When it appeared the company would be forced into a receivership, some of the stockholders raised a fund of \$75,000, but this sum did not prove sufficient to float the concern. After the company's assets had been disposed of by the receiver, it was found there was \$71,000 cash in hands to be distributed.

The receiver was faced with general creditors with claims aggregating \$118,000 and \$35,000 in bills arising after the company was involved and the \$75,000 that had been subscribed by the stockholders. The receiver asked the court for instructions as to how to distribute the money on hand.

In its decision, the court says those who subscribed to the \$75,000 fund are not equal creditors with the merchandise creditors or with the attorneys.

SAUER LOSES CUSTOMS APPEAL

Washington, D. C., March 1—A decision favorable to the government has been rendered by the United States court of customs appeals in the case of P. C. Kuyper & Co. vs. United States, involving the dutiable classification of pieces of steel designed for motor car frames. The decision sets forth that the Sauer Motor Co. caused to be imported at the port of New

York 250 pieces of steel designed and constructed to be used as frames for motor cars. They were all larger in the middle than at the ends. As imported the merchandise was so shaped and reinforced by the processes applied, principally that of pressing, as to form the exact shape required in ultimate use for motor car frames. Certain holes and rivets were added after importation. Synopsized the processes applied were that the article was cast, rolled, pressed and then hammered.

Duty was assessed by the collector of customs at New York as "pressed, sheared or stamped shapes, not advanced in value or condition by any process or operation subsequent to the process of stamping." The importers made claim that the merchandise was properly dutiable as "structural shapes of iron or steel, not assembled or manufactured, or advanced beyond hammering, rolling or casting."

The court observed that the importation in question consisted of a grade of steel devoted to a purpose which common knowledge indicates must be of great strength and as imported was, save for the boring of the holes for the rivets and the riveting, in a completed shape for final use. The merchandise was admittedly a pressed shape and the court ruled that it should take the higher rate.

FRONTIER TIRE COMPANY SOLD

Buffalo, N. Y., March 3—The plant here of the Frontier Tire and Rubber Co. was sold Saturday afternoon in bankruptcy court by the referee, James W. Persons. The entire stock, consisting of various machinery, offered in separate parcels, brought a bid of only \$6,100. They were afterward offered in bulk and sold for \$10,250 to Al G. Irr. There was a good deal of competition from various Eastern plants, also from a Canadian syndicate of buyers. Frederick O. Bissell conducted the sale and Referee Persons confirmed it. It is not known what the buyers will do with the property.

BILL AFFECTS ACCESSORY MAKERS

New York, March 3—Makers of motor car accessories and others are affected by a bill introduced in Congress recently by Representative Langley, of Kentucky, "to prevent fraud and unfair competition in the sale of patented and trade-marked articles."

The bill provides that the owner of every patent and trade-mark shall as a condition of such patent or trade-mark be required to file in the patent office a statement showing the prices at which any article covered by the patent or trademark is to be offered for sale. This statement must show the retail price of each article, together with a list showing all prices and rebates, commissions or discounts of every nature whatsoever at which the said article shall be sold or offered to dealers for the sale of or for the handling of such articles.

This list must be registered in the pat-

ent office under such rules and regulations as the commissioner of patents may prescribe. A new price list may at any time be substituted for a registered price list. All articles must be marked with the retail price at which the same are to be offered for sale and the words, "price registered," followed by the date of such registration.

MOSLER FACTORY SOLD FOR \$93,000

New York, March 3—A. R. Mosler & Co., Mt. Vernon, N. Y., has sold its factory and property to the Bronx parkway commission for \$93,000. This property will be used for an extension of a boulevard to Kensico. Two new factories will be erected in about 6 months and the present arrangement of having the screw machine and the spark plug forces in one plant will be changed. These two departments will be separated, each occupying a plant. The site for these new plants has not as yet been decided upon.

TO MERGE HALLADAY AND NYBERG

Streator, Ill., Feb. 28—The Streator Motor Car Co., of this city, maker of the Halladay car, and the Nyberg Automobile Works of Anderson, Ind., will be consolidated as the result of the purchase of the plant and assets of the latter concern by A. C. Barley, president of the former corporation.

The deal for the Nyberg plant was closed this week when Barley offered \$29,500 for it, \$7,500 in cash and the assumption of liens amounting to \$22,000. The bid has been accepted by the trustee and confirmed by the court.

It is the intention of the new owner to start at once on the 1915 models. It is his plan to manufacture both the Nyberg and Halladay and add two very low-priced models, perhaps a cyclecar, to the present line. Harry Nyberg will continue as manager of the Anderson factory.

OVERLAND PLANT FOR EL PASO

El Paso, Texas, March 2—J. N. Willys, president of the Willys-Overland Co., while on a visit in El Paso, stated that his company will erect a branch factory at El Paso to supply the southwestern California and Mexican trade when peace is restored in Mexico. After inspecting the entire southern trade territory, Mr. Willys came to the conclusion that El Paso is the logical location for the plant.

SINGER FORMING NEW COMPANY

New York, March 3—The announcement has just been made by Charles A. Singer, former president of the Palmer-Singer Co., recently declared a bankrupt, that plans for the formation of a new company for the manufacture and marketing of a new car to be known as the Singer are well advanced. The location of the plant and the size and price of the car will be announced later.

February Production Breaks Record

Detroit Makers Build 36,890 Motor Vehicles

During Month Just Past

DETROIT, March 3—The city's total production of motor vehicles of all classes for the month of February was 36,890, which figure is accurately compiled from production statements furnished by each of Detroit's factories individually. Nearly thirty concerns contributed to this large production. Of course the predominating class of vehicle is the passenger car, of which there were 35,900 manufactured during February. The commercial car total was 540, while the electric vehicle makers contributed several hundred more. It is impossible to give the figures on the electric production for the reason that the electric makers are opposed to their production being made public.

In the passenger vehicle total the Ford company naturally figures very prominently, having produced during February 24,476 cars. This is a record month for the big company, just as was January of this year. However, February with only 24 actual working days, saw more cars turned out of the Ford plant than January. Figuring on the 24 working days, the actual production of Fords was 1,020 cars per day average. Studebaker, Cadillac, Hudson, Chalmers, Hupmobile, Maxwell and Paige-Detroit were also very heavy producers and each reports exceedingly favorable conditions.

Better 1913 February Output

The general reply to the question as to how February's production this year compared with the corresponding month a year ago, was that the month just past was far ahead of a year ago, this despite the fact that the present February was a very severe one. The Hudson company, in particular, reported that February, 1914, was the largest month in its history.

Although Detroit cars are shipped to all parts of the world, it seems to be quite the general condition that a large part of February's production has gone to the west and middle western states, although general distribution all over the country is reported by all.

Nearly every factory states that it expects to materially increase its production schedule throughout the month of March, and it is probable that the present month will show a total production nearly 50 per cent in excess of the figures given above. The manufacturing schedules are decided upon according to the demands of the sales department, hence this production is a direct indication that dealers are wanting cars this year in larger quantities than ever before, with the idea of meeting a heavy demand.

In the light of this general healthy condition of the motor car business in Detroit, there is an indisputable feeling of

optimism among the producers of motor cars, which is a welcome relief from the pessimistic views sometimes heard last fall when money was tight and business relatively dull.

February is usually regarded as the first of the real spring months with the motor car makers, and though its production is never up to that of the 2 months following, it is a good criterion of the business to be counted on later.

BRISCOE CAR FOR \$295

New York, March 3—A small motor car, not a cyclecar, selling at retail for \$295 is Benjamin Briscoe's latest product which will be called the Argo and carry two passengers side by side. The power plant consists of a four-cylinder water-cooled engine, cylinders 2.31-inch bore by 4-inch stroke, cast in block and three-point suspension. The cooling system is thermosyphon, with a splash and pump lubrication, leather-faced cone clutch, sliding gear transmission, shaft drive and with a full elliptic springs front and rear. The wheelbase is 90 inches. Wire wheels of 28-inch diameter will be used. The weight of the car will be 700 pounds.

Mr. Briscoe's new company for the manufacture and sale of the car is the Argo Motor Co., Inc. The factory will be just outside of New York. Mr. Briscoe heads the company as president and general manager while L. E. Latta is vice-president and general sales manager. F. D. Dorman is secretary and treasurer.

Associated with the company are also a number of the old engineers, factory men and dealers who have had a part in Mr. Briscoe's former enterprises.

The company is accepting contracts with dealers and distributors for both domestic and foreign business and expects deliveries to commence in May. The production scheduled for this year is 10,000 cars.

TIRE CHAIN INJUNCTION DISSOLVED

New York, March 4—Special telegram—The temporary restraining order against the Walker Tire & Chain Co., Zanesville, Ohio, by the Weed Chain Co. has been dissolved. Because of lack of jurisdiction, the court has refused to grant a further injunction. On February 3 last the Weed company brought suit against the Walker Tire Chain Co. and R. F. Ely, doing business under name of Connelly Motor Equipment Co., claiming an infringement on its patent, number 723,299. This suit was brought up in U. S. District Court of Southern District of New York.



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Lessons of Santa Monica

THERE are lessons to be learned from the two classics of American motor racing, the grand prize and the Vanderbilt cup contests which were so successfully run off on the Pacific coast last week. There are lessons for others as well as for manufacturers of cars. It was not so many years ago that the popular conception of a race meet, particularly one in which the greatest of America's racing drivers contended for supremacy, was that a motor car race was intended to be a sort of butchery of flesh and steel to make a Roman holiday.

SUCH ideas no longer obtain, even among those who view motor races as sport alone. They recognize that it is in the crucible of a hotly contested long-distance race that materials and designs are given their supreme test—that the normal wear and tear of years is crowded into a few hours of furious pace; that the same speed that overcomes distance also vanquishes time.

IMPROVEMENT in cars due to the lessons learned in racing is evident not only in succeeding speed events, but in the stock cars as they go into the hands of the owner. There is one thing above others that is to be learned from the Santa Monica races;

that is the need of increased oiling facilities where high speeds are to be sustained for long periods. At least nine contestants in the two events were put out of the running by cracked cylinders, stuck pistons, burned-out bearings and similar causes, the foundation of which in nearly every case may be ascribed to insufficient lubrication for the work in hand or to insufficient cooling—two factors which go hand in hand.

VALVES and their operating mechanisms gave trouble in three instances which resulted in withdrawal, but less difficulty was encountered from this source than in previous meets of the character of that on the coast. Also there was much less carburetion and ignition trouble than usually is the case. This may be taken to mean that makers of accessories as well as car builders have taken to heart the lessons of previous races.

AS FOR tires, a great improvement has been shown; an improvement that has been in progress for several years, but which had its most spectacular evidence in Mulford's showing at Indianapolis last year, and its latest in de Palma's non-stop run in the Vanderbilt last week.

The Spring Overhaul

WITH the opening of spring the owner-driver again is confronted with the question of getting his car into commission for the summer season, and if the machine has been in dead storage all winter the advisability of having it completely overhauled will be of first moment. If the car has gone through one or two heavy seasons without overhauling, then it deserves a good house-cleaning this spring. The owner who has driven his car 2 years without a shop overhauling should at least look it over very carefully himself and give it a thorough cleanup if he does not think it worth while to put it into the repair shop.

A GOOD car does not need to have the cylinders taken off after 2 years' use, particularly if the carbon has been removed periodically during the past season, and if the oil has been drained off the crankcase regularly and the case entirely washed out with kerosene or other good preparations for the work. The necessity for a regular overhauling depends largely on the past attention given the car, and that owner-driver who has seen to it that his car has been inspected regularly and gone over every 1,000 miles will find little necessity for a general overhauling.

SOME of the most successful car drivers follow a policy of a good inspection every 1,000 miles. If a service building is at hand, the car is run into it and gone over at a cost of not over \$5. Often the bill is not one-half this. These periodic inspections are excellent in that they detect little troubles while they are yet very minor affairs. It is, in brief, a stitch-in-time policy and generally is correspondingly economical. There are many cases on record where an owner will spend over \$100 in a spring house cleaning of his car, whereas \$25 spent in regular inspections would be much better and a great deal cheaper. The average car owner is competent to regularly inspect his car and look it over. Herr Teufelsdröckh, the old German

philosopher, described man as the only tool-using animal. He said: "Man is a tool-using animal. Weak in himself and of small stature, he stands on a basis at most of 1 square foot. He has to straddle his legs lest the very wind supplant him. He is the feeblest of all bipeds. The steer of the meadow tosses him aloft like a waste rag. Nevertheless, he can use tools, can devise tools, and with these the granite mountain melts like dust before him; he kneads the glowing iron as if it were soft paste; seas are his smooth highway, winds and fire his unwearying steeds. Nowhere do we find him without tools. Without tools he is nothing; with tools he is all."

WITH this quality of surmounting any difficulty with but a few tools, it is not surprising what intelligent work the owner-driver can do in these regular inspections of his cars. Some owner-drivers fortunate enough to have their own garages spend several winter evenings looking over the entire car. This program is possible only with a few, yet where it is intelligently followed out there generally is a story of a successful car, one giving very general satisfaction and one enduring. The motor car is not an exceedingly intricate mechanism, but one that can readily be followed through from one part to another.

FOLLOW Descarte, the French philosopher, who said that the only way to make progress and get to higher levels in reasoning is to progress step by step from the ground on which you stand at present. Going thus logically from what you know forward into what you do not know is both easy and logical. The owner-driver who is not familiar with many car parts will soon discover in truth that he, too, is a tool-using animal and that it is quite easy for him to master many of the things about a car that he thought entirely beyond his range and too complicated for his understanding.

Wisconsin Offered Bounty for Motor Cars in 1875

Musty Records Show that Badger State Was Pioneer in Encouraging Development of Self-Propelled Vehicle

MADISON, Wis., Feb. 28—John S. Donald, secretary of state of Wisconsin, has recently completed research into the musty records of the state department at Madison which indicate that Wisconsin was the first commonwealth in the United States to attempt to induce the perfection of a horseless vehicle. In 1875, he finds, the Wisconsin legislature passed a law offering a bounty of \$10,000 to be paid to the person who invented and put into operation a machine that would "perform a journey of at least 200 miles in a continuous line on the common road or roads running as nearly as may be north and south within the state, and be propelled by its own internal power at the average speed of at least 5 miles per hour working time." Another requirement was that "it be able to run backward and turn out of the road to accommodate other vehicles in passing and to be able to ascend or descend a grade of at least 200 feet to the mile."

Bonus Reduced to \$5,000

It is recorded that an amendment to the law was made in 1876 providing for a statement of progress in the manufacture and the intention of competing for the bounty, to be filed with the secretary of state. Secretary Donald finds that eleven such notices were filed. An act of 1878 authorized the governor to appoint a commission of three to act as judges at the trial and provided for a meeting of the commissioners at the city of Madison on June 10, 1878. There is, however, no record of competition at this meeting. In 1879 the legislature repealed the bonus laws, providing, however, an appropriation of \$5,000 to be paid as a bonus to five parties as compensation for their disbursements and expenses incurred in the construction of a steam road wagon. The law of 1879 stated expressly that "this act shall not be construed as an admission that said wagon was a satisfactory compliance with the requirements." This would indicate that there was some contention as to the success of the invention.

The persons who received the \$5,000 bonus were all residents of Winnebago county, Wisconsin, as follows: F. Shomer, A. W. Farrand, E. Gallagher, M. T. Battis and J. F. Morse.

It is believed that this interest by the state legislature was prompted by the construction in 1873 and 1874 of a steam road wagon by the Rev. J. W. Carhart of Racine, Wis., who was a circuit rider. It consisted of an ordinary buggy equipped with two steam engines, each independent of the other, applied to the front and rear axles. The crude device threw human beings and animals into hysterics and public meetings were held condemning the use of

the machine. The Carhart road wagon is thus declared to be America's first horseless carriage.

Tells of Ride in 1879

Nils P. Haugen, a tax commissioner of Madison and a member of the state legislature in 1879, claims the historical distinction of having had the first ride in the first motor car used in Wisconsin.

"During the session of 1879 the first horseless carriage was brought to Madison from Oshkosh, having taken almost a week to come across the state," said Mr. Haugen today. "William Hall was then the assemblyman from that district of

Winnebago county and he and his friends worked hard to have the award given to the Oshkosh inventors. While the machine was here every member of the legislature was given a ride, but the machine could never be accredited with having exceeded the speed limit."

IOWA HAS BOOSTER CAR CROP

Des Moines, Ia., March 4—Latest population and motor car census figures show that Iowa ranks second in the United States in the number of motor cars as compared with the number of inhabitants. The state ranks sixth in the number of cars without regard to relative population. But it has one car to every thirty-two people and that is better than the standing of any other state except California, which has one car for every twenty people.

Every dealer in Des Moines now has more orders booked than at this time last year and with this encouraging statistical report, the outlook is extremely encouraging for a banner year, and for an even higher ranking for the state before the year is ended.

As a barometer to the prosperity of the people, the Iowa motor car census is considered excellent. Here is the ranking of the ten leading states:

State	Cars	Population
California	118,135	1 to 20
Iowa	68,120	1 to 32
Ohio	90,122	1 to 50
New Jersey	50,353	1 to 50
Michigan	53,301	1 to 52
Massachusetts	52,034	1 to 64
Maryland	45,000	1 to 60
Illinois	79,247	1 to 70
New York	121,793	1 to 74
Pennsylvania	73,924	1 to 103

Iowa has almost two and one-half times as many cars in proportion to population as New York, which leads in the total number. California, which is second in the number of cars owned, can ascribe its rank to the fact that a great percentage of the population is made up of wealthy people from other states who go to California to spend their winters and naturally take their cars with them.

Iowa has almost twice as many cars in proportion to population as Ohio which is one of the great motor car manufacturing states; three and a half times as many as Pennsylvania; nearly two and a half times as many as Illinois and almost twice as many as Michigan or Indiana where most of the other American cars are made.

Even Massachusetts, with her excellent roads and high standards of living, has only half as many cars in proportion to population as Iowa. New Jersey offers a little more competition but does not come even close to the record of the Hawkeye state where the farmer regards a motor car as a necessity.



SHOWS, CONVENTIONS, ETC.

March 2-7—Show, Utica, N. Y.
 March 2-7—Show, Sioux City, Ia.
 March 3-7—Show, Ft. Dodge, Ia.
 March 4-7—Show, Tiffin, O.
 March 5-7—Show, Elgin, Ill.
 March 7-14—Boston passenger car show.
 March 12-14—Show, Hilledale, Mich.
 March 9-14—Cedar Rapids, Ia.
 March 16-21—Cedar Rapids, Ia.
 March 17-21—Boston truck show.
 March 21-28—Maritime show, St. John, N. B.
 March 26-31—Show, Racine, Wis.
 April 12—Show, Palermo, Sicily.
 April 12-19—Austrian show.
 September 26-October 6—Berlin show.
 October 16-26—Paris show.
 November 6—Olympia show.

CONTESTS

March 1-25—Tour of France.
 March 2-20—Army four-wheel drive tractor endurance tests, France.
 April 19-29—Coupe de Tourisme, 1,000-mile cyclecar and light car endurance test around France.
 April 22—Track meet, Bakersfield, Cal.
 May 24-25—Targa Florio race.
 *May 30—Indianapolis 500-mile race.
 May 30—New York track meet.
 May 30—Track meet, Providence, R. I.
 June 1—Florio cup race, Island of Sicily.
 June 6-7—Track meet, St. Louis, Mo.
 June 10-11—Isle of Man road races, Great Britain.
 June 17-18—Hill climb, Uniontown, Pa.
 June 30—Track meet, Sioux City, Ia.
 July 3-4—Road races, Tacoma, Wash.
 July 4—French grand prix, Lyons.
 *July 4—Three hundred mile race, Sioux City, Ia., speedway.
 July 4—Track meet, Providence, R. I.
 July 17-18—Speedway races, Seattle, Wash.
 July 25-26—Belgium grand prix road races.
 July 26—Le Mans cyclecar grand prix race.
 July and August—French army truck subsidiary trials.
 August 2-9—Six day cyclecar reliability in French Alps.
 August 28-29—Road races, Elgin, Ill.
 September 5—Track meet, Milwaukee, Wis.
 September 6-7—Italian grand prix.
 September 7—Track meet, Providence, R. I.
 September 9—Speedway races, Pomona, Cal.
 September 9—Road race, Corona Beach, Cal.
 October—Kerosene motor tests, Paris.
 October—Gaillon hill climb, Paris.
 October 2-3—Track meet, Oklahoma City, Okla.
 October 2-3—Track meet, Trenton, N. J.
 November 8-11—Track meet, Shreveport, La.
 November—El Paso-Phoenix road race.

* Sanctioned by A. A. A.

Boston Awaits 1914 Model Display

Managers of Hub Show, Which Opens Saturday, Claim Record Number of Exhibits

BOSTON, Mass., March 4—An army of workers numbering about 500 took possession of Mechanic's building Monday and ever since they have been hustling to get the big structure into shape for the annual motor show that opens Monday night.

According to figures now prepared, the Boston show will eclipse all others here and abroad in the number of makes represented. Figures compiled for Manager Chester I. Campbell show that Boston in 1910 secured the international record with 122 makes of cars and 650 complete cars and chassis exhibited. This year the figures show that the exhibitions at the different cities here and abroad had makes as follows:

Paris	London	New York	Chicago	Boston
*132	*126	**79	**86	***138

*Including trucks.

**Passenger cars only.

***Cars and trucks; may be increased.

Some idea of the Boston show as it has grown in the past few years is given in the following figures:

Year	Passenger	Truck	Total	Attendance
1908 ..	77	7	84	69,000
1909 ..	88	18	106	92,000
1910 ..	97	25	122	107,600
1911 ..	102	41	143	146,400
1912 ..	107	66	173	225,000
1913 ..	108	68	176	245,000

This year Boston has 88 makes of pleasure cars scheduled for its opening, and there may be a few more jammed in somewhere before Saturday night. However, even with 88, Boston leads New York and Chicago in the number of pleasure cars. Following the week of passenger cars there will be a display of trucks, this exhibition starting Tuesday evening and continuing until Saturday night.

Boston will have some splendid decorative effects this year. The plans call for an illumination of the exterior of the building on a scale never before attempted. Eight large electric signs will form the apex of a series of lights which extend below the cornice for the entire length of the building. For the first time in the history of motor shows in Boston the big tower of the structure will be illuminated with lights that may be seen for blocks.

The general motive of the decorative scheme this year is planned along Italian lines. Ernest W. Campbell, who designed the plans, spent some months in Europe looking for something new and he found it. The machinery hall is to present a Roman scene. Marble panels will be erected on either side of the entrance lobby, and elliptical arches reached from fluted pilasters spanning the corridor. White statues will stand out in bold relief against a dark background of foliage.

One big Roman arch is to be located at the entrance to the hall. All the beam work is to be hidden by handsomely painted tablets, while carved decorations conceal other supports. Massive columns

of antique bronze will stand out prominently, each of which will be surmounted by large illuminated glass globes with the names of the exhibitors painted on them. Thousands of electric lights will be strewn through the building. The side walls are to have the marble cornice effect, with paintings reproducing scenes in Italy, and Italian traceries will be used above the windows. The stairways going to the second floor will be hidden by electric lights of an original design surrounded with foliage, while a canopy effect will add to the deception.

OMAHA SHOW PROVES SUCCESS

Omaha, Neb. Feb. 28—The ninth annual Omaha automobile show, held under the auspices of the Omaha Automobile Show Association closed at the Omaha Auditorium today under the most favorable conditions. The immense crowds that clamored for admission during the week, the ideal weather and the keen interest displayed in this territory in the industry, all combine to make good the prediction that Omaha's 1914 show was to be one of the most successful held in the middle west.

Every available foot of floor space was filled with displays. The main floor and stage were occupied by the pleasure cars, the basement with commercial cars and the north corridors with motorcycles and cycle cars.

The decorative scheme was both handsome and practical. The decorating expense was about double that of last year. The entire interior was sheathed in billowy drapings in white with a green figure. About the balcony were great plaster fig-

ures holding a pair of twin lanterns in gold. Ornamental filigree standards indicated the names of the exhibitors and on the floors were cream-colored rugs with green trimmings.

Thirty-five pleasure car dealers exhibited. Of this number there were ten dealers who also showed commercial cars and four dealers who handle electric cars. This is the same number of exhibitors as last year, but through the withdrawal of accessory dealers, more space was given and there were more cars shown.

Always with the coming of the annual show comes the awakening of interest in the industry, and the "predictions" for the coming year. This year is no exception. The industry in the middle west is in a decidedly healthy condition. Never before have there been so many optimistic reports on the sale of cars for the coming year as are heard on every hand in this territory at the present time. Last year was a remunerative year for Omaha dealers, having sold cars to the value of \$10,819,158 and the accessories amounting to \$2,284,500. This, the dealers say, will be far surpassed in 1914.

The present winter in Nebraska has been mild and business of all kinds has enjoyed a good season. Reports on crop conditions are very favorable. With the farmers and "big business" men feeling good, the motor car industry likewise takes on a bright outlook.

Omaha's dealers and distributors have a large territory in which to dispose of their products. The people of Nebraska, the western four tiers of counties in Iowa, South Dakota, northern part of Kansas, northwestern portion of Missouri, eastern part of Montana, Wyoming and Colorado, all contribute to the coffers of the Omaha dealers. The greatest demands, however, come from Nebraska and the western parts of Iowa.



PANORAMIC VIEW OF THE OMAHA MOTOR SHOW

What was particularly noteworthy at the 1914 show was the fact that the interest of the buying public seemed to be centered on those cars that sell for \$1,000, or below \$1,500.

COLUMBUS CARNIVAL OPENS

Columbus, O., Feb. 28—A fairly good crowd attended the opening of the second annual motor car carnival which started here to-day and will last for 1 week, despite the rain which fell during the evening. The carnival is given under the auspices of the Columbus Auto Trades Association and the Columbus Automobile Club and takes the place of the annual show.

The carnival was held along motor row which comprises North Fourth street between Broad and Chestnut streets. The streets are decorated for the occasion and all of the salesrooms are in gala attire. Dealers who are not located on the row have been given space to show their models in the salesrooms of the other dealers. In all fifty different makes and about 250 cars were exhibited.

The carnival was opened by a parade and fire works. Music was furnished by bands in motor trucks and the latest models were inspected by thousands of visitors.

According to the dealers in Columbus and central Ohio the prospects for 1914 are excellent in every way. While it was a little slow up to the first of the year, as was the case in every section of the country, there has been a marked improvement since that time. Dealers believe that the sale of medium priced cars will be one of the features of business in central Ohio. While the cheap cars will undoubtedly be in much demand, it is expected that cars ranging in price from \$1,200 to \$2,200 will also be sold in large numbers. There appears to be a tendency towards cars of that price more than in former years.

During the month of February the weather was not the most favorable for activity in motor car circles. A severe snow storm followed lower temperatures and consequently demonstrating was out of the question in many cases. But inquiries have been numerous and a number of sales have been closed for delivery as soon as the winter breaks.

HOOSIERS PROLONG STREET SHOW

Indianapolis, Ind., March 2—Local dealers and manufacturers have decided to continue their opening this week, because of the bad weather that prevailed last week. The first 2 days of last week traffic of all kinds was almost suspended because of the worst snow storm of the winter.

Free bus service is being maintained between the various sales rooms. A parade of old and new cars Saturday afternoon and a banquet at the Claypool Hotel Saturday night were special features of the opening. Many factory sales branches are

entertaining their dealers from over the state.

The sales branch for the Oakland was host last Wednesday night at a beefsteak dinner at the Claypool Hotel, about fifty of the company's dealers from Indiana and Illinois attending. H. H. Roose, of Fort Wayne, Ind., representative for the Maxwell, entertained Indiana Maxwell dealers at a banquet at the Denison Hotel on Thursday evening.

STANDARDS COMMITTEE NAMED

New York, Feb. 28—In accordance with the custom to revise annually the personnel of the standards committee, the council of the Society of Automobile Engineers at its last meeting made appointment of members of the standards committee for the year of President H. M. Leland's administration. There are few changes in the personnel of the whole committee or in the chairmanships of the divisions thereof. The Research division and the Electric Vehicle division have been newly created. The following divisions have been discontinued for the time being: Gear Tooth Shapes, Joint Standards, Technical Index and Sheet Metals.

A schedule of meetings of the divisions up to within a few weeks of the next meeting of the society has been made. It has been arranged to hold a meeting or con-

vention of the whole standards committee April 7, 8 and 9. Heretofore the meetings of the standards committee have been held semi-annually, shortly before the national meetings. It is now the intention to hold quarterly meetings of the standards committee with a view to advancing the work of the divisions as much as possible so far as it may seem wise to do.

S. A. E. PLANS SUMMER MEETING

New York, March 2—The time of the sessions and program of the summer meeting of the Society of Automobile Engineers to be held at Cape May, N. J., has been finally determined by the council as follows:

TUESDAY, JUNE 23

2:00 P. M.—Standards Committee meeting.

WEDNESDAY, JUNE 24

2:00 P. M.—Business and professional sessions of the society.
8:00 P. M.—Entertainment by sections of the society.

THURSDAY, JUNE 25

9:30 A. M.—Professional session.
2:00 P. M.—Professional session.
8:00 P. M.—Dinner and European trip lecture.

FRIDAY, JUNE 26

9:30 A. M.—Professional session.
1:00 P. M.—Adjournment sine die.

The meeting will be held in the new Cape May Hotel, a fireproof structure situated on the beach and having accommodations for 600 guests. In connection with the hotel there are facilities for golf, tennis, fishing, boating, bathing, etc.

Two U. S. Territories Buy More Cars

Shipments to Alaska and the Philippines by American Makers Increase During 1913

WASHINGTON, D. C., Feb. 28—Details of the shipments of motor cars and parts to the noncontiguous territories of the United States during December last and the calendar year ending December 31, 1913, with comparative figures for the corresponding periods, have been announced by the bureau of statistics.

Due to the fact that traffic between this country and Alaska is suspended during the winter months, there were no shipments of motor cars to Alaska during December of 1912 and 1913. During the calendar year the shipments increased from 15 cars, valued at \$19,664, in 1912, to 27 cars, valued at \$25,449, in 1913. Shipments of parts, not including tires and engines, decreased from \$4,034 to \$3,931.

Hawaii is not holding up as a good purchaser of American-built motor cars. In December, 1912, this country shipped to that island 75 cars, valued at \$130,208, while in December last the number had decreased to 48, valued at \$63,595. During the calendar year the number of cars shipped to Hawaii declined from 636, valued at \$1,024,238, in 1912, to 597, valued at \$1,006,937, in 1913. Exports of parts declined in value from \$14,591, in December, 1912, to \$9,441, in December last, but during the calendar year increased from

\$86,331 to \$92,228 according to the report.

Shipments of cars to Porto Rico, like those to Hawaii, are not holding up. In December, 1912, there were 40 machines, valued at \$44,486, shipped to that island, while in December last the number had decreased to 27, valued at \$29,615. During the calendar year the number of cars shipped to the island was 409, valued at \$562,081, in 1912, while in 1913 the number was 294, valued at \$365,391. Shipments of parts showed a similar decline, the figures indicating that parts worth \$4,844 were shipped in December, 1912, while in December last the value was only \$4,670. During the calendar year the shipments declined in value from \$114,316, in 1912, to \$82,872 in 1913.

American motor cars are winning their way in the Philippines, the statistics showing that the number of cars shipped there increased from 38, valued at \$45,277, in December, 1912, to 54, valued at \$53,785, in December last. During the calendar year the number increased from 475, valued at \$616,761, in 1912, to 679, valued at \$843,958, in 1913. Shipments of parts likewise increased in value from \$1,877 in December, 1912, to \$9,229 in December last, and from \$53,070, in 1912, to \$74,660, in 1913.

Bumper Crop of New Motor Car Bills

Californians Must Pay Horsepower Tax—Eastern States Favor Uniform Law

SAN FRANCISCO, Cal., Feb. 28—More than 100,000 owners of motor cars in California will have to pay to the state a horsepower tax on their machines, ranging from \$5 to \$30. The law to that effect, enacted by the last legislature and effective after January 1, will be enforced forthwith, the supreme court deciding today that the law is constitutional in all points.

Test cases were brought by the motorists of the state, in the belief and hope that they could tear holes in the new law. They attacked it on a number of different grounds. On each, however, the supreme court ruled that the law was soundly constructed.

The motorists contended the law was unconstitutional because it imposed a tax on the inhabitants and properties of the counties for county purposes. The attorney-general replied that it was a police measure, and further, that the road taxes provided for under the act were authorized by the constitution.

Bill Partial Police Measure

Judge Henry Melvin, who wrote the decision bearing on this point, says that the act is in a sense a police measure. But he adds:

"Repair of the public highways is not a police measure, yet it is evident that the bill was passed for the principal purpose of raising revenue for use in the upkeep of such highways." He calls attention to the fact that one-half of the funds to be derived from the tax shall be paid into the public road funds. "The court," he says, "is not concerned with what use is to be made by the state with the revenue derived by the tax, and the rest of the act would be valid, even if that clause relating to the distribution of the funds were void."

The act is not local or special in its nature because a greater portion of the funds is to be expended outside the cities, says the decision. Judge Melvin adds: "The state is charging for the privilege of using the roads for these highly-destructive vehicles at a rate of speed not attainable by those propelled by animal power. The privilege is open alike to the rural and urban owner of a motor car."

As to the justice of graduating the tax according to the horsepower of the machines the decision reads:

"In the statute we are endeavoring to construe there is an attempt to apportion the charge with some reference to the destruction or wearing power of each motor vehicle. While we cannot say that the relative horsepower of vehicles is the most scientific basis of measuring their potency

of injury to the roads, we cannot say that it is not without justification."

High-powered cars, the court reasons, are usually heavier than lighter-powered cars, and therefore do more harm, and ought to pay a larger tax.

DOUBLE TAXATION IN ARIZONA

Phoenix, Ariz., Feb. 28—Arizona's present law requiring the state registration of motor vehicles is manifestly unconstitutional, says Secretary of State Sidney P. Osborn in his annual report. The primary object of the law, states Osborn, is to raise funds for the regulation of motor traffic. The present fees result in the collection of far more money than is necessary for that purpose. This, declares the secretary, makes the statute a revenue law and unconstitutional, as motor vehicles are also taxed as personal property. The result is double taxation. Two dollars a year is the motorcycle registration fee; for motor cars up to 25 horsepower the fee is \$5, from 25 to 40 horsepower it is \$10 and machines above 40 horsepower, A. L. A. M. rating, are assessed \$15 annually. It costs no more to regulate a large machine than a small one, Osborn asserts, and he claims that there is no reason for the discrimination.

Osborn also recommends that the chauffeur's license be abolished or that applicants for such licenses be subjected to examination. Under the present law the secretary is required to issue a license to any applicant who has \$2 to pay for it. "The chauffeurs receive no benefit and the public is not protected from careless or incompetent driving," the secretary reports.

FAVOR UNIFORM MOTOR LAW

New York, Feb. 28—The work of compiling a uniform motor law draft for the states of Delaware, Pennsylvania, Maryland, New York and such other states as are willing to join in the movement was completed at a meeting in New York last Wednesday, a bill having been drawn for presentation to the legislatures of the several states interested. The commission which handled the matter was appointed by the governors of the several states, and the bill was drawn by Sylvester D. Townsend, Jr., of Wilmington, Del., former city solicitor.

The other commissioners present were Charles G. Guyer, secretary of the Delaware Automobile Association; Highway Commissioner E. M. Bigelow and Robert R. Hooper, president of the Pennsylvania Motor Federation, representing Pennsylvania; Dr. H. H. Row of Baltimore, presi-

dent of the Automobile Club of Maryland, representing that state, together with Highway Commissioner Harry A. Roe of Maryland.

The proposed act covers all the various phases of the present motor laws and was prepared from a comparative digest of the existing laws in those states. It is, however, comparatively brief, containing about 8,000 words, as against the Massachusetts law of 14,000 words, for instance.

It aims at uniformity on at least five cardinal points of motor legislation, namely, speed, examination of all operators, power to refuse to grant a license, and for cause, to revoke one already granted; control of the non-resident motorist, and imposition of penalties for violations of the law. It provides that vehicles shall be operated with due regard to public safety and to the width of the highway and the condition of traffic, and that speed in excess of 24 miles an hour shall be considered prima facie evidence of reckless driving should an accident occur. It does away with the distinction between "chauffeur" and "operator" insofar as license is concerned, and provides for an examination as to competence before a license is granted to any driver. It gives the power to the secretary of state or the motor vehicle commission or commissioner, as the case may be, to refuse license and to suspend or revoke it for intoxication or other cause, and thus opens the way also for the control of the non-resident motorist through complaint to the proper authorities of his home state.

Though not embodied in the bill, it was voted the sense of the commission that lights should be carried on all vehicles, whatever their motive power.

ASK REPEAL OF ROAD STATUTE

Kenosha, Wis., March 2—The county board of supervisors of Kenosha county, Wis., has voted unanimously to demand the repeal of the present Wisconsin state aid highway law on the ground that the operation of the law has not been satisfactory, so far as Kenosha county is concerned. The board will send copies of its resolution to every county board in the state and ask general adoption, so that statewide petitions for repeal may be presented at the 1915 session of the legislature. Kenosha supervisors declare the law promotes extravagance.

The Kenosha Automobile Club has been working the "force clause" in the state aid law as hard as possible during the last 2 years and succeeded in having more good roads built in Kenosha county than any other county in the state, proportionate to population. The "force clause" permits freeholders, in this case the Kenosha Automobile Club, to raise funds, which when placed in the township treasuries, oblige the towns to appropriate six times the amount. The town appropriation in turn draws an amount equal to one-half from the county and a sum equal to

one-fifth of the total from the state aid fund.

Last year the club applied \$14,500 of its funds in this manner, and the county has been obliged to raise too much money to meet the club's "force funds" to make the thing pleasant. This has led to the agitation for the repeal of the law.

DISCUSS MOTOR TRUCK WHEELS

New York, March 3—Two sub-committees of the Standard committee of the Society of Automobile Engineers met this morning at headquarters in this city to discuss the question of wheels for motor trucks. At this meeting of the commercial car wheels and truck standards committees, the matter of the carrying capacity of solid tires was taken up. At present confusion arises due to the fact that one tire maker publishes a table of tire sizes giving the load carrying capacity of different sizes and another tire maker publishes a similar table but giving different road carrying capacities for the same size of tire. Conflicting load carrying capacities of this nature are confusing to the engineers who in designing truck wheels are uncertain as to the requisite tire equipment. The Standards committee is endeavoring to have all tire makers, if possible, give uniform load carrying capacity figures.

The question of the number of bolts securing different makes of solid tires to the wheels was further discussed. At present one make of tire requires so many transverse bolts through the wheel felloe to hold the retaining flange in place. Another make of tire requires a different number of bolts so that boring holes in the felloe is necessary. To standardize this work, the committee is considering using three different numbers of bolts for the same size tire or wheel. These are as follows:

26-inch wheel.....	10, 15 or 20 bolt holes
28-inch wheel.....	12, 18 or 36 bolt holes
30-inch wheel.....	12, 18 or 36 bolt holes
32-inch wheel.....	12, 18 or 36 bolt holes
34-inch wheel.....	14, 21 or 42 bolt holes
38-inch wheel.....	14, 21 or 42 bolt holes
40-inch wheel.....	14, 21 or 42 bolt holes

Different makes of tires require different numbers of bolt holes due to the fact that in some the tire retaining flange secured by these bolts has little work to perform where as in other makes of tires there is a constant tension on this flange and consequently more bolts are required. With the three different numbers of bolt holes in the different sized wheels, it is possible to attach any tire.

KENOSHA DYNAMITER FOUND GUILTY

Kenosha, Wis., Feb. 27—George Koscak, an Austrian laborer formerly employed by the Thomas B. Jeffery Co. of Kenosha, Wis., was found guilty of the charge of transporting dynamite from Racine to Kenosha for the purpose of blowing up the residence of Jerry W. Decou, factory manager of the Jeffery company, and faces a prison sentence of from 3 to 10 years.

Duray to Compete in 500-Mile Race

Frenchman to Enter Diminutive Peugeot in Memorial Day Speed Classic

PARIS, Feb. 17—Europe will be represented by at least six challengers in the 500-mile race to be run on the Indianapolis speedway May 30. Five foreign drivers—Boillot, Goux, Guyot, Chassagne and Christiaens—have already made official entry and a sixth, Arthur Duray, will file his nomination as soon as certain formalities have been complied with.

Duray, who was born in New York but who has lived in Paris since boyhood, will be a teammate of Boillot and Goux and drive a Peugeot. His mount doubtlessly will be the smallest in the race, for its cylinder area is only 183 cubic inches compared with 450 cubic inches allowed under the rules. Although only 6 cubic inches bigger than the American Ford and smaller than the smallest Maxwell, the Peugeot has shown nearly 96 miles an hour on the level and has covered nearly 400 miles of very hilly winding road at an average of 63.2 miles an hour.

This car was driven by Georges Boillot in the 3-litre race at Boulogne, the last of this series of races, and is now the property of M. Meunier, the French chocolate king. Duray has secured the use of the car for the race, and although it is a pigmy among giants it will be a dangerous competitor. The car will be equipped to cover the whole distance without a stop, and owing to its light weight, the driver should have no call to change his tires.

TWO ROAD RACES FOR SICILY

Paris, Feb. 20—Sicily will have two motor car races this year. The Targo Florio will be an 800-mile, 2-day race right round the island, starting from and returning to Palermo, and following the coast line the whole way. The date selected is May 25 and 26. Practically any type of car can be entered, for the maximum cylinder area is 549 cubic inches. It is practically impossible to make a good showing with a motor of this size, for the course is a succession of hills with dangerous hairpin turns calling for a short-wheelbase, lively car and an unusual amount of skill on the part of the driver. The fastest time on the Targo Florio course was made by Georges Boillot with a single cylinder Peugeot long-stroke motor.

The second Sicilian race will be the Coupe Florio run on the Madonie course, not far from Palermo, June 1. The course is 93 miles round and has to be covered three times. In previous years the Florio Cup has been competed for on the Brescia, Italy, course. Vincenzo Florio, the donator, has this year made arrangements by which it shall be put up for competition by the Automobile Club of Sicily. Italian par-

ticipation in these two races is likely to be strong. Felice Nazzaro has already intimated that he will start in both events, driving a Nazzaro car built in his own factory.

SETS NEW BROOKLANDS RECORDS

London, Eng., Feb. 10—At Brooklands today the D. F. P. car with a four-cylinder motor, made a clean sweep of the short-distance records in class B, which is for cars with a piston displacement of 125 cubic inches. Below is given the time and speeds of the D. F. P. and the previous records:

Distance	Time sec.	M. P. H.	Previous record
Half-mile ..	20.07	89.70	83.53 m. p. h.
Kilometer ..	25.06	89.26	82.85 m. p. h.
1 mile	41.05	87.70	82.10 m. p. h.
2 miles	83.41	86.32	No previous records
5 miles	213.13	84.45	
10 miles	427.09	84.29	

The car was driven by Hornsted in today's trials. Rudge-Whitworth wire wheels were used.

OPPOSES A. A. A. CYCLECAR CONTROL

New York, March 2—The Cyclecar Club of New York has notified the Cyclecar Manufacturers' National Association that it is opposed to the control of cyclecar contests by the American Automobile Association and suggests that an independent governing body be formed to take charge of cyclecar races. Such a protest comes as the result of a meeting of the A. A. A. contest board at which the cyclecar manufacturers' association asked the A. A. A. to draft and submit rules for cyclecar contests.

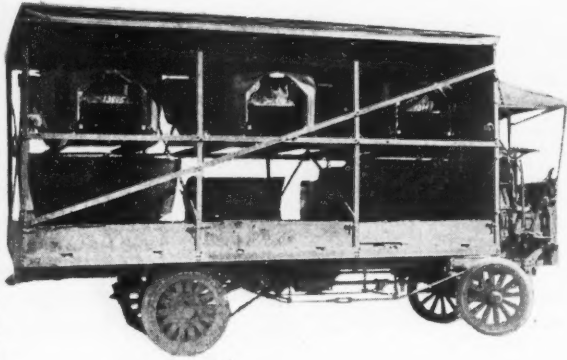
The Cyclecar Club of New York is planning to promote a cyclecar show in the spring, possibly in May. The exhibits will be displayed in the ball room of the Hotel McAlpin, provided satisfactory arrangements can be made.

BERLIN FIXES SHOW DATE

Paris, Feb. 20—After an agreement with other European show promoters, Berlin has fixed its show dates for September 26 to October 6. This show will be the first of the European series, and will be followed by Paris in the middle of October, London in November, and Brussels in December.

BRETZ NOT IN PHIPPS CONCERN

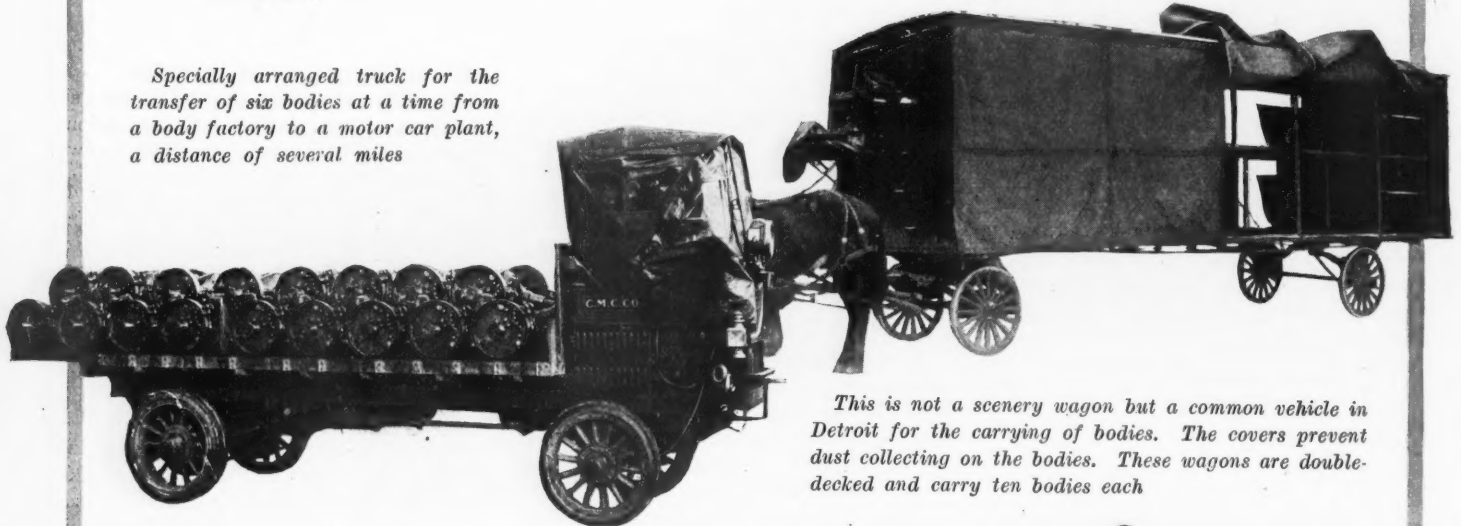
New York, March 4—Special telegram—The J. S. Bretz Co., through its president, J. S. Bretz, has issued a statement to the effect that the company is not interested in the Massnick-Phipps Mfg. Co., Detroit, Mich., which latter concern is developing a cyclecar motor in addition to its other activities as stated in a Detroit dispatch in last week's issue.



Specially arranged truck for the transfer of six bodies at a time from a body factory to a motor car plant, a distance of several miles

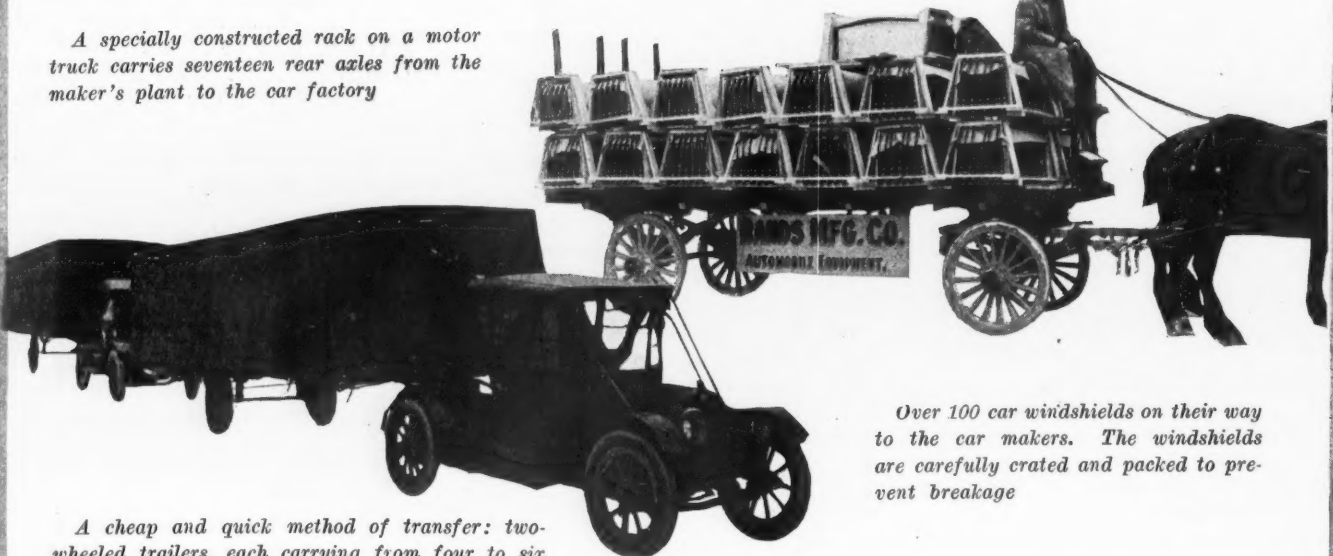


A truckload of over 100 tire casings being delivered from a rubber factory to a motor car plant



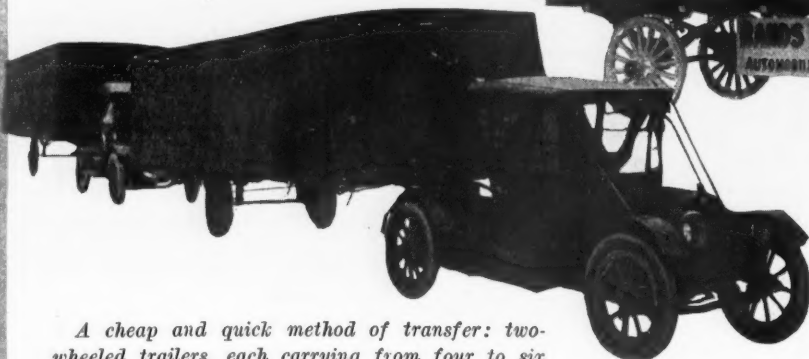
This is not a scenery wagon but a common vehicle in Detroit for the carrying of bodies. The covers prevent dust collecting on the bodies. These wagons are double-decked and carry ten bodies each

A specially constructed rack on a motor truck carries seventeen rear axles from the maker's plant to the car factory



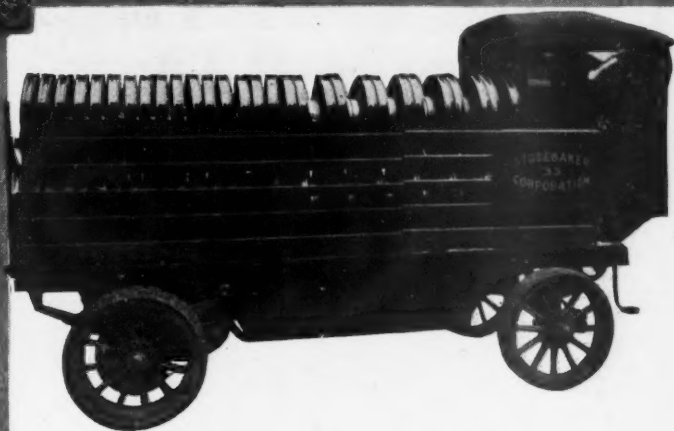
Over 100 car windshields on their way to the car makers. The windshields are carefully crated and packed to prevent breakage

A cheap and quick method of transfer: two-wheeled trailers, each carrying from four to six bodies, hitched to factory service cars



Transportation of Motor Car Parts in Michigan Metropolis

"CARRYING coals to Newcastle is like teaching a woman how to talk," runs the ancient saw, but carrying motor car parts in motor cars is a wise solution of a once baffling transportation problem that confronted the motor car manufacturers of Detroit when they started to produce machines in large quantities. In fact, the motor car, or more accurately speaking the motor truck, plays as important a role in the manufacture of the motor car as the stamping machine, the drop forge and the multiple drill. Many flotillas of heavy commercial wagons are engaged in Herculean tasks daily in the busy metropolis of Michigan, carrying tires, fenders, engines,

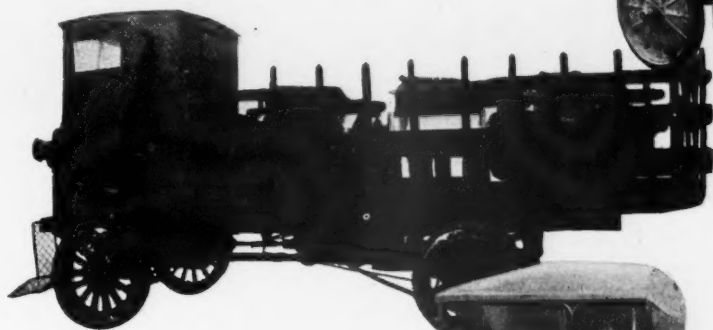


Many front and rear wheels are transported by trucks. There are approximately 150 in this load. Packing wheels has become as much of an art as loading a hay rack

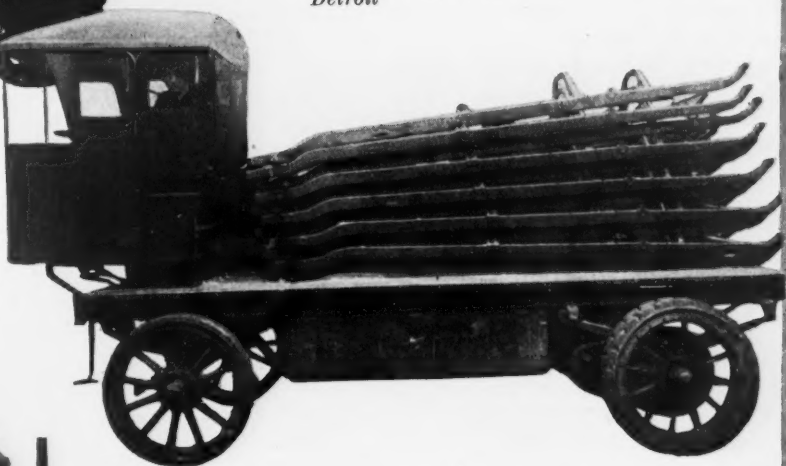
Many ingenious methods of carrying large quantities of parts conveniently have been devised by Detroit concerns. This illustration shows a rack for carrying eight rear axles and gear box units in one load



Half a dozen motors is about as heavy a load as a self-respecting truck carries in Detroit



A dozen frames being very conveniently hauled on a single truck makes for quick transfer and is one of the advantages of having parts, plants and motor car factories in the same city



In transferring fenders in Detroit, each fender is carefully wrapped in burlap to save it from scratches. As great care is taken in packing such a load as is exercised in moving mahogany furniture

Detroit's Production Requires Special Transfer Methods

axles, wheels and the hundreds of other units that when combined form a complete motor car, from the railroad yards or parts makers' plants to the motor car factory. In turning out motor cars at record speed and in wholesale quantities, minutes are precious and the manufacturers have found that commercial wagons are time-savers in this transfer work. Many of the trucks are specially built for the kind of work that they are to perform. For example, there are trucks with protected sides to carry bodies and protect them from the dust and others with racks on which tires and wheels are piled. Some makers have resorted to the use of trailers.

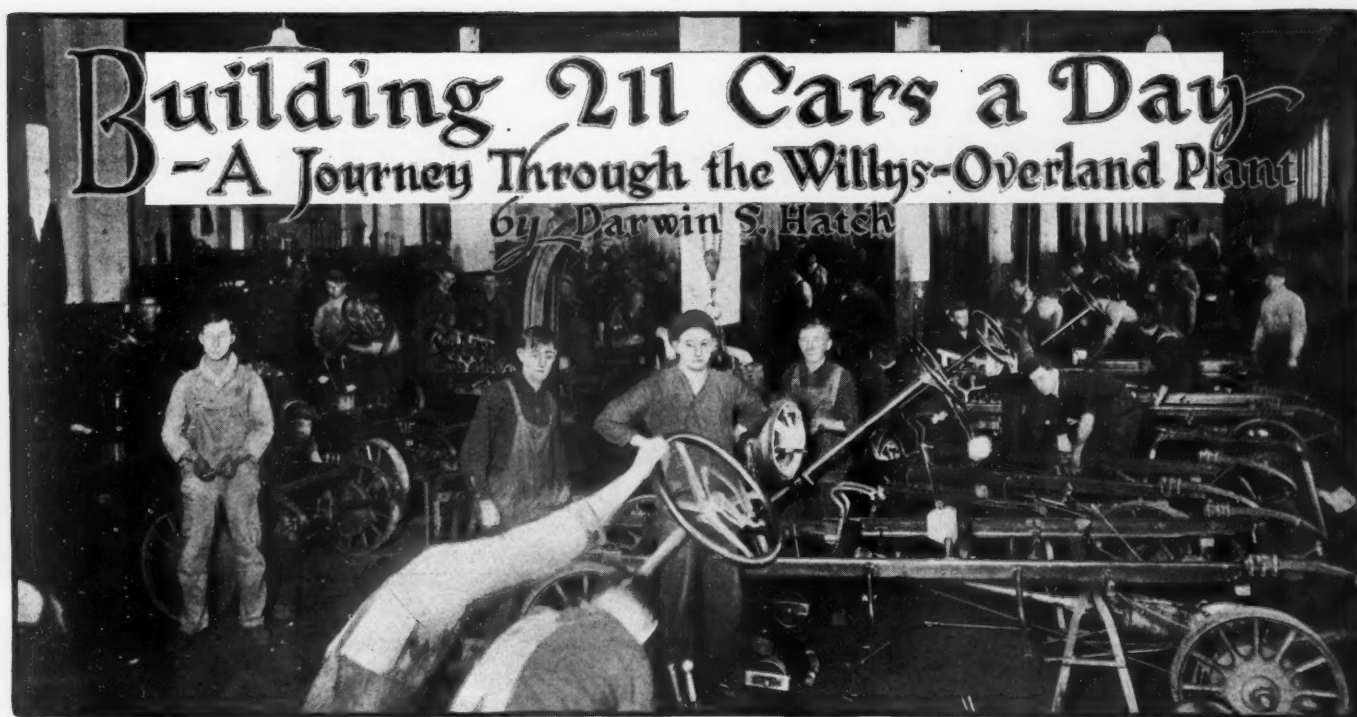


Fig. 1—A portion of the chassis assembly department. The work going forward here is the mounting of the power plants and running gears upon the complete frames. Gangs of two or more men travel from one chassis to the next, each having a certain small part of the work to do. They are so routed that when each chassis on the floor has been visited they are back at the starting point

THEY tell the story of the German who, when he was considering the purchase of a certain popular make of motor car, upon being informed that the manufacturer turned out a car every 3 minutes, made it a part of his order that the one for him be given at least 5 minutes for its construction. Probably there are very few motorists who, like our German friend, wrongly imagine that rapid-fire production is synonymous with skimmed attention. Most of us realize that when cars are being completed at intervals of a few minutes, it simply means that those reaching the shipping platform in such quick succession are individuals of a fleet of hundreds whose various parts have been in process of construction for days or weeks.

Few of us, though, have any conception of what it means to create each week 1,500 mechanical steeds, to turn motor cars out of steel, rough lumber and cow hides, in one factory at the rate of more than 200 each day. Only those who have seen it can imagine the organization of the army of workers busy in an enchanted forest of special machinery.

Not a Road Race

It was with the idea of learning how the Willys-Overland Co. managed to turn out 211 Overland cars every 24 hours that I went out to the factory at Toledo last month. Alighting from a street car I dodged with undignified haste to avoid what I took to be the finish of a road race, but which turned out to be only twenty of the cars returning from the road test. Following these up a busy city side street I inquired of a hurrying individual the way to the Overland factory.

"You're in it now," he responded in disgust.

Then the noon whistle blew, and 6,000 men stampeded out of every door that lined the half-mile long street. After the tide of humanity had engulfed the lunch-rooms that line the car tracks I made my way into some dingy frame buildings that house the offices of the company and look very mean in comparison with the tall brick structures where the actual manufacturing is carried on. This comparison emphasized a cardinal point in the policy of John North Willys, the man who is responsible for that small city within a city; that policy which puts the product and the producers above the rest of the organization.

Division of Production

The division of the production end of the plant itself brings out a feature of motor car building that is not generally understood; that the car consists of an assembly of assemblies. For instance, a part of the car is made in the plant of the Kinsey Mfg. Co., which is a part of and yet managed separately from the Willys-Overland Co., so that it may take outside work at times to keep working at capacity. The Kinsey factory is within the grounds of the Overland plant and practically all of the sheet-metal portions of the car are products of the subsidiary concern. Radiators, windshields, frames, fenders, tanks, etc., are built in the Kinsey portion of the establishment.

Not that the car made in this factory is an assembled car as the term is used ordinarily. On the contrary, every portion except such accessories as the magneto, carburetor, electric system, etc., is made from

the raw material either at this plant or, as in the case of the cylinder castings, in a subsidiary one. But the method of production is the making of first the separate parts, then their assembly into complete units, then into systems and finally the bringing together of these systems into the complete chassis on the one hand and the complete body on the other. That these two factors are complete when they come together as the final step, will be realized from the statement that this "final assembly," as it is called, requires the services of four men for just 15 minutes.

My first insight into the explanation of Overland output and factory efficiency was my introduction to General Superintendent Shepler, whose business it is to see that every part of every car is at its proper place at the proper moment and that every 2½ minutes of the 9-hour working day a completed car starts on its trip to some Overland dealer. To fill in his spare time he performs a similar office for the other Willys properties.

How Production is Increased

The company was manufacturing 170 cars per day until a few weeks ago when times opened and the production was increased in 11 days to 211 cars. One day 170 cars were turned out, then on a day's notice the production increased to 180, then to 185, and so on. This speeding up was not so difficult as might be imagined at first thought, because the company had gotten ready for it to a certain extent by making up 1,480 motors ready to put in the chassis and approximately 2,800 gear-boxes; so that increasing production from day to day was largely a question of adding greater force in the assembling de-

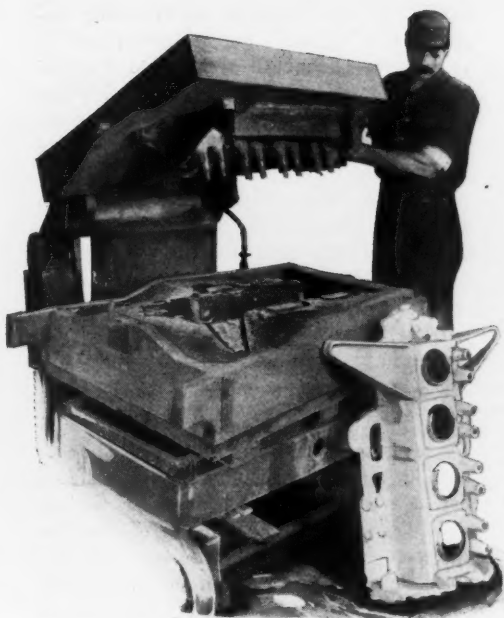


Fig. 2—First step in making an engine base. One of the moulding machines, showing the sand mould on the machine and the pattern on the upper portion. When the mould is poured full of melted aluminum the casting shown at the side is the result

partments. Sometimes these departments are worked $\frac{1}{2}$ hour or 1 hour overtime per day.

The production manager works through eight assistants who spend their time in different parts of the factory. One is in the forge shop, one looks after stock materials, one has the building and yards, one has charge of the first assembly, one of the second assembly, and so on. These eight men report to the production manager at 9 and 11 each forenoon and twice each afternoon. At these four times each day they report whether the production of the different departments is up to the requirements of the schedule or ahead of it. If one department is lagging, the reason is found and corrected at once, in other words, the entire production of the plant is checked four times a day.

From Raw Material to Car

It goes without mentioning that even with its force of over 6,000 men and its highly organized production program that it would be impossible to build cars at the rate and at the low cost it is done in the Overland plant without a great deal of special machinery and highly specialized methods. It is impossible, of course, to follow the entire car through the factory in this article from raw material as it is dumped on the shipping platform, until it again arrives at the shipping platform as a completed car. To follow one or two of the main portions or systems of the car through the factory will serve to illustrate the machinery and methods which apply to all portions.

One of the most interesting portions

of the Overland factory is the production of the radiator. This part of the car is built in the Kinsey Mfg. Co.'s portion of the establishment and is largely a matter of the sheet-metal forming. The manufacture of the radiators may be considered in two distinct parts, one the making of the shell and the other the manufacture of the core—that portion which is the radiator proper.

Building a Radiator

The shell is made of lead-coated steel, called "terne plate." The first step consists of cutting and pressing the front to shape, which is done at one blow of a great hammer, the second is the stamping of the single radiator side plate.

This comes from the press on the machine which stamps it out as a flat strip which is then bent around the form to get the desired Overland radiator shape. It is cut, stamped and a lock seam turned up on the edge at one operation. The third step is the soldering together of the front plates and side plates. Then the trunnions upon which the radiator is hung are riveted on the side plates. After this the top water box or tank is made, this is stamped out of sheet brass and bent around a form. A mal-

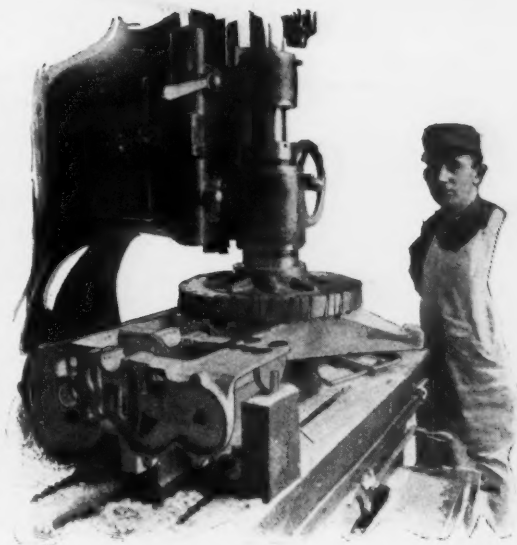


Fig. 3—Next step in making the engine base. This is the milling machine which faces off the entire bottom of the engine base at one operation so that the lower half of the crankcase will fit closely

leable-iron water hose connection is then riveted to the water box. The bottom water box is made in the same way, all of it being stamped out of sheet metal by presses which form it in a die. After the entire sheet, with its water boxes is soldered together, the filler collar and the socket for the spacing bar and the drain cock connection are attached, completing the making of the shell.

In order to decrease the time required and the number of steps, a new die press now is being placed in operation, which will press out the entire shell of the radiator from one piece and at one blow. This will make it unnecessary to solder together the side and front plates. This new punch press cost \$22,000 and is an instance of the lengths to which a factory will go to reduce the time required to turn out one little part.

Radiator from Brass Ribbon

The manufacture of the core consists of the formation of a series of double cells properly shaped from a single ribbon of brass. This is done in a crimping or coremaking machine of which there are about thirty in the plant, each machine turning out two radiator cores per hour, or 68 double cells per minute. Each machine is operated by one man and it is entirely automatic, the operator simply starting and stopping the machine. The flat brass ribbon is fed from a spool on one side and comes out on the other side on a table in the form of a continuous ribbon of double cells, as shown in Fig. 5.

This is cut in proper lengths by the operator, who cuts lengths to make an entire radiator before the core for the next radiator is started on. The shape of the radiator is such that various lengths of these strips are needed in one radiator and the cells are

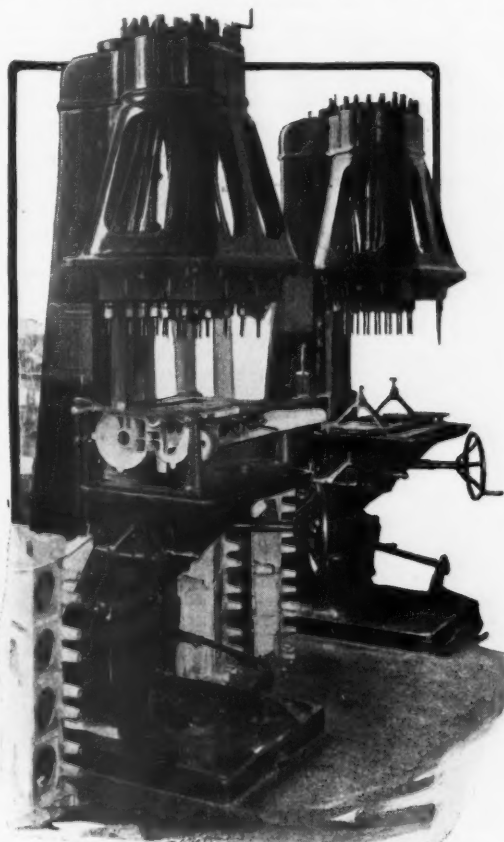


Fig. 4—Drilling the engine base. Sixty-three different holes are drilled in the casting on just three machines, called gang drills, two of which are shown in the illustration. Each machine has twenty-one drills, all going at once

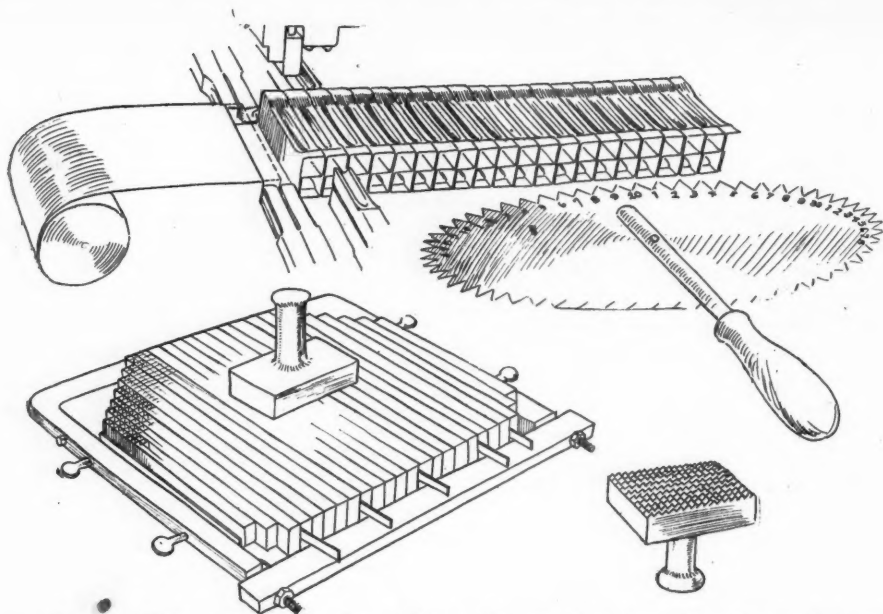


Fig. 5—Making the radiator core. This is the part that does the cooling and is made of brass ribbon which is fed into what looks like an over-grown sewing machine and comes out as a row of double cells. These are counted automatically by the toothed wheel and cut off to the proper length, then arranged in a metal frame and their edges are mashed down with the corrugated block.

counted by a counting wheel which the operator runs along the ends of the cells and which counts the number of cells automatically. As the strips are cut they are piled on a truck and taken to the core forming bench, where they are dropped into forms of correct shape so that the proper positions of the different lengths of the strips are determined automatically.

In order to make the cells all even and to mash down their edges so that they will solder properly, a setting tool which looks somewhat like a waffle iron is placed over the cells and forced down. This tool has corrugations on its face which are small enough to go inside of the cells easily at their outer end but get larger as they approach the inner end so that the cell openings are spread and the metal strips thus brought more closely together. The core is now ready for soldering and it is picked up by a trolley and dipped in an acid bath, then swung to a solder bath and dipped gradually, one-half at a time. This solders up the joints in the core.

Giving Them the Water Cure

The acid dip requires the services of one man for 24 seconds; the solder dip takes 1 minute, usually two men on the job, one to lower the core gradually and the other to place it properly. The core is then tested for leaks. This is done by plugging up all the holes except the drain cock and an air hose attached to this and the radiator filled with air under 12 pounds pressure, while it is dipped under water. Workmen watch for bubbles and when the presence of a leak is indicated by the bubbles the hole is soldered up and the test is continued until no bubbles appear. The core then goes to an assembler who slips on the shell and water boxes and solders all the seams by hand. The completed radiator is again tested under 10 pounds of air. The test after putting on the shell is

made for the reason that occasionally in soldering it on leaks are sprung and seams opened up.

After this test the radiator goes to the enamel room where it is set up and sprayed with a compressed-air gun which sprays paint all over it. After this is dried the enamel coat is applied in the same way.

If one man were working alone making radiators with the same equipment it is figured that he would be able to turn out about two per day. The present output of the plant is about 300 per day for Overland and a number of other concerns. To indicate the better methods employed than were used a year ago, the Kinsey company states that although it is building twice as many radiators as it was at that time, only half as many testers are needed.

Front Axles in the Making

The front axle does not appear to be a very complicated piece of the car, but the making of the single main portion alone requires a large number of different operations. The I-beam axle is made from a square steel bar 69 inches long and 1½ inches on the side. One end is first heated to a white heat in an oil-burning furnace and from six to ten axles are heated at the same time. After this heating the axle is

carried to what is called an upsetting machine and its sparkling white-hot end is inserted in the mouth of a machine which presses the end backwards, shortening the bar somewhat, but at the same time making it larger on the end. This is done to provide material for stamping the spring seat later. This operation of "upsetting" takes two men for about 16 seconds, from the time the stock is taken from the furnace until the next bar is taken from the furnace. The bar is then put back in the furnace and the other end is heated and treated in the same way.

Steam Hammers at Work

Again the bar goes into the furnace and one end heated. From the furnace it is carried by two men to a monster steam hammer, under which is an anvil having two dies, one forming the flat portion for the spring seat and the other stamping the square bar into the I-beam shape. This is called the roughing forge. The bar is placed in the die and the hammer gives it three or four blows which flattens the enlarged portion to the shape of the spring seat, then it is turned on its side in the other die and the steam hammer pounds it into the shape of the letter I.

From this forge it is carried directly to another machine which is the finishing forge and trimmer. In this trimmer the "flash," or the metal squeezed out between the faces of the die and the hammer during the forging is trimmed off; after which it is carried back to the first forge for one final "truing-up" blow. During the time the axle is in the forge

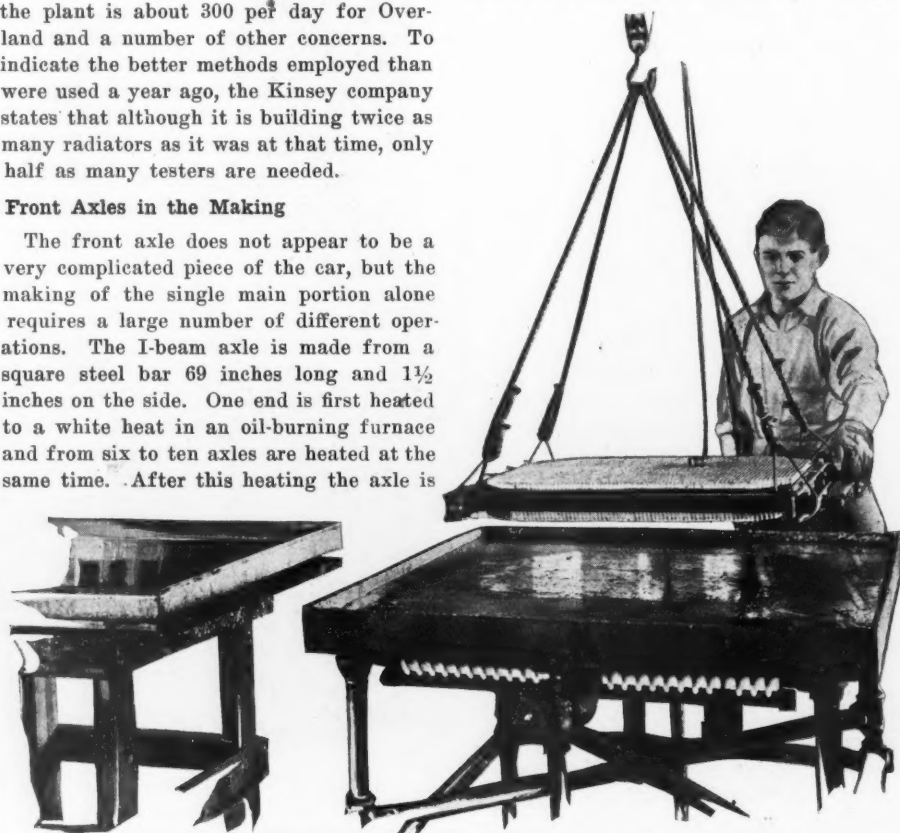


Fig. 6—Dipping the radiator core in melted solder. After the core is made up as shown in Fig. 5 it is dipped in acid bath shown at the left and then in the molten solder.

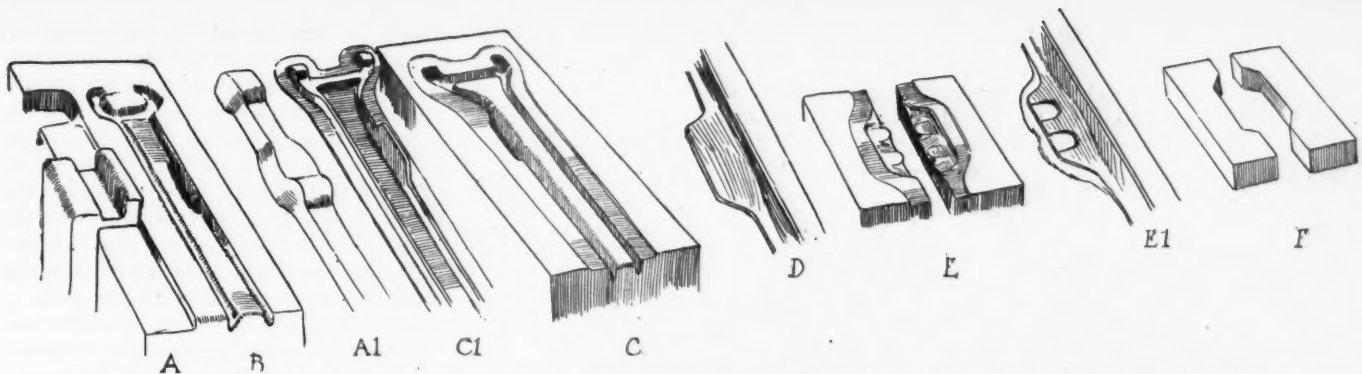


Fig. 7—Steps and dies used in forging a front axle. A shows the die used in the first operation, that of butting up the end of the square bar as at A1 for the spring seat; B is the die that gives the rough form for the yoke end, also the beginning of the formation of the I section; C is the die that gives it more nearly its final shape and C1 is the end of the axle after it comes from C; the web around C1 is called the flash and is cut off next; D shows the spring seat turned over and flattened out; E is the die that finishes the spring seat and E1 is the piece after leaving E; F is the die in which the flash or web on E1 is trimmed off

and is being hammered, steam is played over the die and the axle to keep the die clean and also to help loosen the piece from it. The steam also removes the scale or hard shell on the cooling metal that comes when it is being hammered. The entire operation of forging the spring seat and giving the I section to one end requires the services of two men and takes 1 minute 45 seconds.

Begins to Look Like an Axle

After the other end is heated and treated in the same way, the axle begins to look something like the way it really appears in the car, but there is a great deal to be done to it yet. It is now ready for the hammer which finally flattens out the flanges for the spring bolts and from there it goes to the shearer which trims off the flash again.

Up to this time each end has been

treated separately, but now the whole axle is heated to a white heat and is placed in a press which bends it to give it the drop in the center. This one machine does two things, it not only gives the axle the drop shape, but before that it stretches the axle. The axle is first placed between two jaws which move apart and which stretch it several inches. Then it is placed on an anvil in the same machine and pressed down with a hammer which bends it to its final shape. The stretching and pressing takes less than 50 seconds, two men doing the job.

In the Inspection Room

After a final heating, the axle goes to the inspection room where it is placed on a test block which shows whether or not it is straight and of the proper shape. It is easy to imagine that with all this heating and hammering and pressing and pulling that has been going on it is quite likely to be anything but exactly straight. It is surprising how nearly correct most of the

axles are when they are placed on the test block. What little misalignment there may be is corrected by hand forging which trues up the axle to its exact shape. This is done while the axle is hot and again after cooling to make sure that it has not warped in its final cooling. There are two men on each of these jobs and the process requires between 3 and 4 minutes.

This ends the forging of the axle and it is then loaded into a little electric truck that plies between the factory buildings and is hauled to the machine shop. It is first placed on a special milling machine by which the ends are faced off; this mill has eight cutters, four operating on each end of the axle so that both sides of all four yoke ends are finished at once. It takes 3 minutes and 7 seconds to set the axle, do the milling and remove it.

A Hole a Minute

This milling is only preparatory to drilling the spindle holes. The latter is accomplished on a special gang drill which drills the four spindle holes in the yoke ends and the eight holes in the spring seats at the same time, twelve drills working at once. The holes in the spring seats are finished in this operation, but two drills are used in each of the spindle holes, the last one being a tapered drill. It takes 12½ minutes from the time one axle is placed in the machine until the succeeding one is in position.

From the pile of drilled axles it is picked up and placed in vises on a bench where the tapers are reamed out by hand. This takes one man 2 minutes and from the bench it is carried to a single drill where the spring-bolt holes are countersunk, this also taking one man 2 minutes.

The main portion of the axle now is complete and is ready for the assembly room where it is set in a vise on a bench which has steering knuckles, tie rods and the other parts of the complete axle piled around it conveniently. The holes for the spindles are

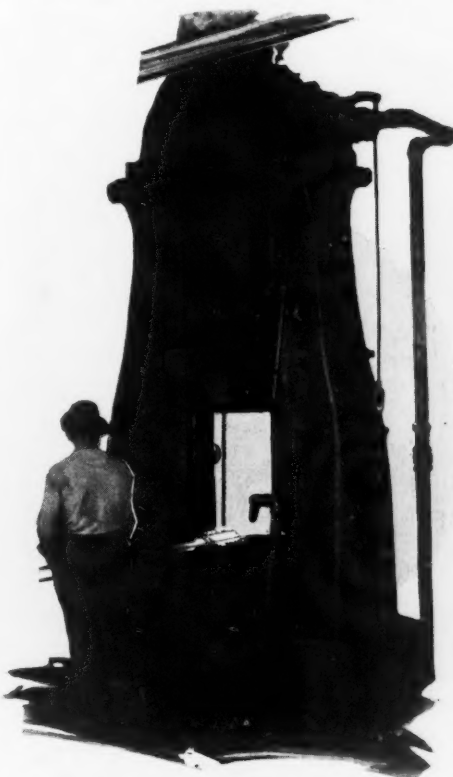


Fig. 8—An early step in the making of a front axle. The white-hot end of a square bar under the massive die-forging hammer

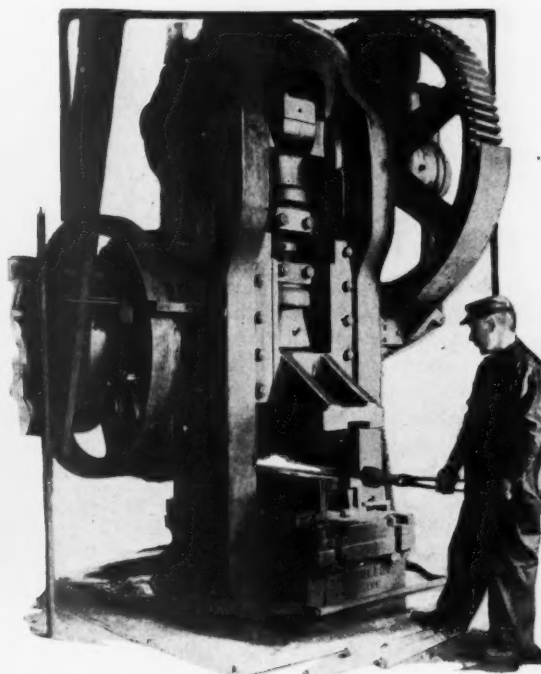


Fig. 9—Shearing off the flash on the axle C1, Fig. 7. The white-hot metal squeezes out like putty under the blows of the massive hammers

again reamed out by hand, the spindle put in place, the tie rods attached and trued up by a gauge to make sure that the tie rod is the correct length. The steering rod is attached and the axle is complete ready

lastly the single blow from the forge hammer which trues it up. Every piece is at the spot where it will be most handily in reach and machines are all arranged so that any part will have to be handled the least

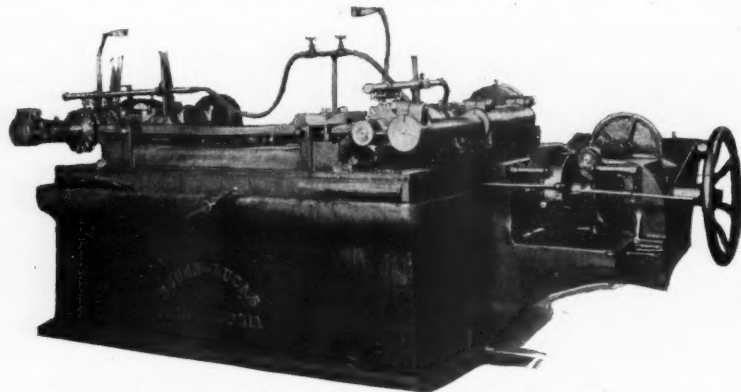


Fig. 10—Milling eight parts of the axle at the same time. A milling cutter squares off each face of the four yoke ends, ready to drill

for the general assembly. Front axles are forged at the rate of 114 a day by the day shift, and 132 daily by the night shift.

The complete course of the radiator and of the front axle from the raw material to a finished unit as just described serves to show the general way in which all the parts of a car are handled and the organization and special machines by which rapid and accurate production is accomplished. The same methods with the necessary modifications hold true in the making of all the other parts of the car, and the special problems presented by them are solved in special and sometimes in very ingenious ways. It is only possible to hint at these in the space at hand.

Cuts Four Gears at Once

Everywhere that multiple production is possible several pieces are turned out at the same time, for instance, in making gears, four spiral gears are cut at the same time on one machine, the four blanks being placed on the same mandrel or hub and the cutter cutting the teeth in all of them at once. The operation is just the same as if a single gear of very wide face was being cut. These gear blanks are forged from a flat slab, three blows of the steam hammer bringing one part of the slab into a round form and in another die at the same forge five operations are needed to bring it into its final form after which it is passed on to a trimming machine which shears off the rough edges. These ten operations on the gear blank are all completed in between 14 and 20 seconds, so the speed at which the men work can be imagined.

In forging the crankshafts from a straight bar, ten operations were needed in the three successive shafts and eleven in two others. Three strokes of the hammer are needed to break the straight bar into the zig-zag shape, this being done at one side of the forge and at the other side the zig-zag forging is given six blows which bring it into its final shape. Then follows the trimming off of the flash and

number of times and will have to be carried no farther than is necessary.

Probably the best illustration of the development of the machine arrangement idea is in the making of the frame members in the Kinzie plant. Side rails of the frame come into the plant as cold-rolled sheet steel in long strips about 7 inches wide and 3-16 inch in thickness. These sheets are first placed on a 16-foot shear which cuts them to the right shape. In going into the shear, which is a long, massive machine, it is placed on rollers which carry it in and comes out on rollers, so that aside from the mere placing and removal of the piece, the operation is automatic. The flat piece is cut by the shear so that it has the kick-up at the rear and the downward bend for the front horn. A second machine cuts off a diagonal which corresponds to the rear horn. The next machine trims the flat shape to the exact shape. The flat sheared pieces are now ready to be formed into the channel sections and for this they go into the hydraulic die press which is just beyond the shear. This forms them into channels. The press has six hydraulic cylinders and requires 40 seconds to do the work. The rough channel then goes to a machine called the flatter, which hammers down the bulges in the vertical part of the frame,

caused by the bending. It then goes to a welding machine in which the front horn is welded to the front end of the frame, and then is placed in a jig for the drilling and punching operations. There are a number of holes in each frame and this gives the exact location of each hole and also indicates by the color of the bosses on the jig, which one of the fifteen drilling and punching machines the hole is to be made by. The frame with its jig is handled by two men, one at each end, the third man going along with the frame to operate each of the machines. The frame is carried from one machine to the next, two men at either end holding it in position while the third man operates the punch or drill. Each drill and punch is equipped to make one size of hole and the frame is carried from one machine to the next in regular order, the machines being arranged so that when every one of the holes is made the frame is back at almost the point where it started.

The men have become very proficient in this work and get from one end of the line of presses to the other in a remarkably short time. The time from the start of putting on the side jig until the team gets back to the starting point with the jig off and the frame member all ready for assembly is 5 minutes and 20 seconds.

Division of Labor

The organization of the factory is such that each man has a particular job and does nothing else. Even in the assembly where the different parts are being put together, this division of labor is followed out. In the assembly of the frame this is illustrated particularly well. After the front spring hanger has been fitted on and riveted the frame member which we have followed through the plant goes to the frame assembly. Here it is placed on an assembly stand which is an adjustable steel frame-work that can be made to fit any size of frame and automatically line it up. Piled on the floor inside of the assembly stand and just below the point where they are to be used are the cross members which have been under construction at the same time as the side members.

This assembly stand is one of a score or

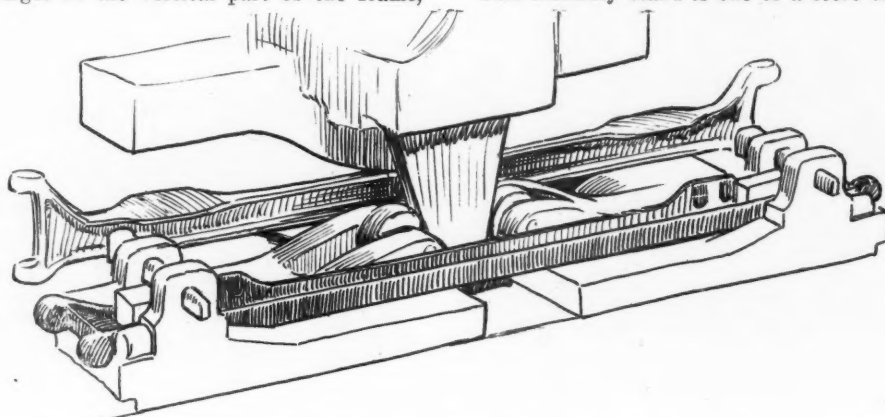


Fig. 11—The machine which stretches the axle and then bends it downward for its "drop." The axle at the front is being stretched and that at the rear is being pressed downward by the curved-face press

more arranged in long rows with aisles between and from one to the next pass groups of men in regular order. Each gang begins at one end, passes down one row performing a certain service at each assembly rack and comes back on the other row so that when each assembly rack has been visited the gang is back at the starting point ready to commence anew.

A Quick Frame-up

When the frame member has been removed from its jig, it is loaded upon a band truck which runs on a miniature railway from one department to the others in the building, and hauled to the frame assembly department.

When our frame member comes in on its hand truck from the punches it is picked up by a man at either end and put on one side of one of the assembly stands. On the other side its mate is waiting for it, then comes a gang of two men who first line up and position each side rail, then clamp firmly the stout middle cross-member, next the front cross-member, then the one immediately behind it and last the rear cross-member. All of this requires just 2 minutes and the first gang is on its way to the next assembly plant.

It is followed by the force of three riveters who in 4 minutes put the twenty-one rivets in the frame which hold all of its parts together. One man carries the pneumatic hammer and one has a long rod for holding the head of the rivet, while the other end is being upset with this hammer. A boy handles the hot rivets, having a small furnace near the frame-assembly stand and it is his business to have a rivet in the hole when the others are ready.

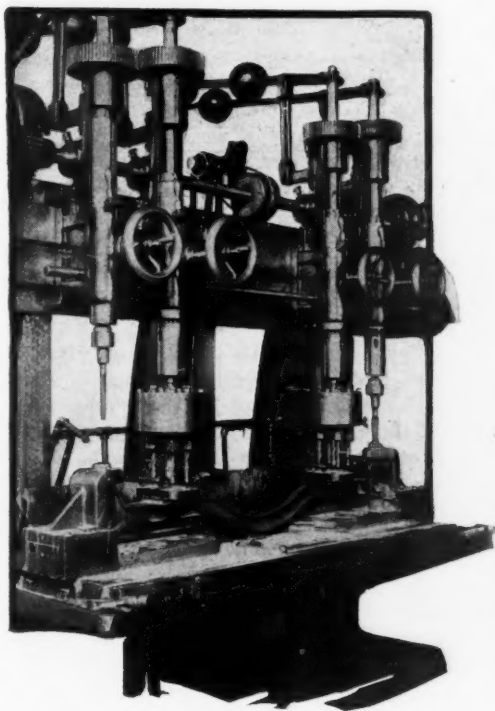


Fig. 12—Drilling all the holes in the front axle at one time. The eight holes for the spring bolts and the four holes in the yoke ends are all made by ten drills working at the same time. It takes 12½ minutes to do the work

Another gang now takes the frame for the final riveting and for the attachment of brackets, step hangers, braces and so forth. There are several gangs who have special parts to put on the partially assembled frame. The parts for the spring boards at the rear, the tire carriers and several other similar parts are drilled for after the frame has come from the assembler's hands.

Each gang consists of three men and they work on the piece-work plan and are very rapid on their particular jobs. The time from the preliminary riveting until the frame is ready to go to another department for another assembly is 26 minutes actual working time.

Teamwork in Body Mounting

An evidence of the teamwork and method is in the mounting of the bodies upon the chassis. The present Overland plans are to work in groups of six and each group mounting three bodies per hour, although it is expected to increase this to four bodies per hour later, that is, in reality twenty-four bodies are mounted in the hour—three by each of the eight gangs. The eight chassis are pushed onto the assembling floor on quickly demountable trucks, the eight bodies are mounted on trucks immediately back of them. All eight crews begin to work at once and are compelled to be through practically at the same time. The organization of the gang is especially good and an excellent example of motion study.

Each man has his own particular job at which he has become an expert and forms one of a series of men who attack the rapidly materializing car in rotation. When he is through with his own particular job there is a bench at the side where he must sit down. There are special benches for tools, work benches and so forth, and the looking after these and seeing that they are back in their places is a part of the general work. It seems as important to the general scheme to have the tools in the right place as to put the body on correctly.

It is not so much the wealth of special equipment and labor-saving devices that have made the production of 211 cars a day a fact at the Overland factory; it is more the organization of the factory and the loyalty of the men. This may be explained by the fact that there are in the factory 700 men who have been working there for 15 years. In one machine shop room 80 per cent of the

men have been there for 10 years. Of the thirty-three foremen in the Overland factory there have been only two who have changed during the past 5 years and never have any of the superintendents of the

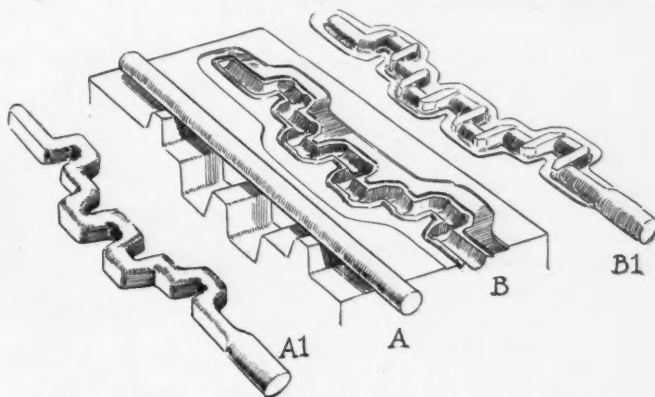


Fig. 13—Forging a crankshaft; A shows the shaft as it comes into the factory on the first die, ready for the drop of the hammer which begins its forging; A1 is the way it looks after the hammer has hit it a few times; it is then dropped into die B under the same hammer, and comes out as B1. The web or "flash" on the shaft is trimmed off next

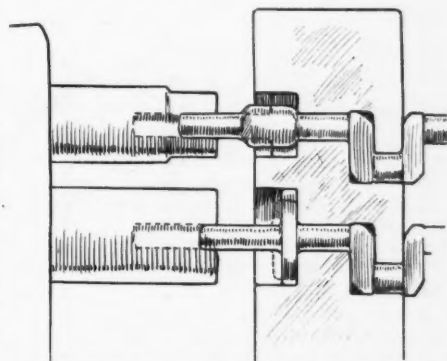


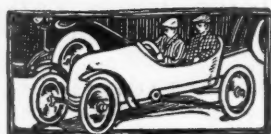
Fig. 14—Squeezing up the flywheel flange on the crankshaft. The machine has two presses, as shown. The crankshaft in the upper one is shown its appearance when put in the machine and that in the lower one, when it leaves. To waste no time, there are always two crankshafts in the machine, one getting the first squeeze and one the second

departments been changed. Many of the men never have worked in any other factory than this plant.

Rifle Practice and Motor Cars

This long service has a double effect. Not only has it made the men wonderfully adept at their own particular jobs, but it has given them a feeling of loyalty and a feeling of proprietorship that could be gained no other way than by long service. These feelings are fostered by the management in its welfare work among the employees, the company maintaining a rifle range with prizes for marksmanship, grounds for basket ball and baseball and similar sports. And a bowling alley with prizes for tournaments.

There are three or four different transportation systems about the factory, including the little electric trucks which ply between the different buildings carrying the parts and materials. Also there are hand trucks within the buildings—some on rails and some that may go anywhere. Also there are the monster overhead traveling cranes.



Cyclecar Development

How to Design and Develop a Cyclecar—Production of First One

By William B. Stout

IN building a cyclecar first make your drawings. It is much cheaper to develop a car on paper than in the piece. The last little fitments put on the car will determine whether the design looks amateurish or not. Hence have every fitment and control figured out and designed to fit in its proper place before starting to build. This will save many a day of idleness while waiting for changes. Most of this can be done on the original lay-out.

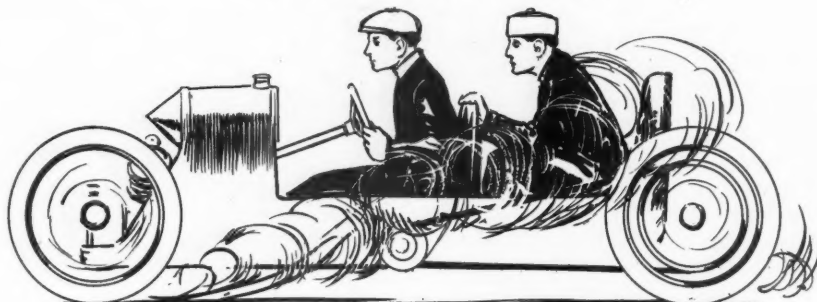
First drawings should be at least one-quarter size, and should be made on detail paper and

very carefully to scale. Make a plan view, a side view and two end views, with such smaller views of details, such as spring suspensions, and parts that are covered by other parts in separate spaces. The one big sheet can show every detail of the car and from this the detailers work. **Performance, Price and Public**

The designer of the car will spend his time chiefly on this, the original lay-out, and see that every piece is right, the general arrangement good from every standpoint, and will check up the mathematics on all engineering. In making the drawing he will keep performance first in mind, price next, and public last, except for car looks. The cyclecar is a new vehicle and the public must be educated to its demands, not the car to the public's.

Do not rush the drawing of this lay-out. When the first is about one-third done the designer may get a real idea and throw away the drawing and start an entirely new lay-out, cheaper, simpler, better and more reliable, with better appearance. This will mean starting over again it will seem, but the first lay-out has shown things and hence is a part of the work.

After several attempts, at last the designer gets a lay-out that really looks good to him. This he pores over and after it is really done, after 10 weeks' work, perhaps, studies it for several days for weak-



The second car ordinarily looks 1,000 per cent better than the first, and still has room for improvement. When four or five cars have been built then the experimenter feels about ready to let an outsider run the machine

nesses, unthought-of stresses, or for ugly design. In this work, one keeps the whole idea in mind, not the separate units as controlling the mind. This comes later.

In seeking performance, the first item is efficiency. This car must be run with a small motor and hence must have three things to give it maximum speed and reliability; low wind resistance, low road resistance and light weight. The car must follow the wind-resistance idea closely and be as narrow as consistent, remembering that the riders will demand protection on windy, stormy days by top and windshield, and these must be considered.

Tread and Weight

For road resistance, the tread should be as narrow as the design will allow, as the wider the tread the greater will be the power required to overcome obstacles. Weight must be watched closely to allow of efficient hill climbing with the small motor, and to keep down tire expense. With the narrow tread, the weight must be low to give stability, and yet at least 8 inches road clearance must be allowed. Attention should be paid to the weight distribution and some of the weight hung over the rear axle. In laying out the design the general lay-out of the top should be included to give the general effect and an idea of how the fittings will fasten in their proper places.

These are but a few items of efficiency. Great attention must be given to getting as much as possible of the engine power to the rear wheels, and no material or workmanship must be spared to this end, while the motor to pull its best is better if connected so that the gear ratio always will allow of the engine pulling at its best speed. In with the item of efficiency comes that of springing and minimum axle weight, a subject previously discussed in full.

Next to the performance of the car comes cost. No part must be de-

signed merely for what it will do. Good design always gets the effect for the least outlay. One could design a differential of heat-treated vanadium gears, ball bearings and watch workmanship, and it would do the work well, but if a differential is unnecessary on narrow tread why add \$10 to \$50 to the car cost when no better result is obtained from it? The good cyclecar designer is the one who knows what to leave off; where to make one piece and two bearings do the work of ten pieces and twenty bearings. The fewer the parts the lower the upkeep and repair expense.

Every unnecessary part is eliminated from cyclecar design, but do not by that gather that one does not have remaining all the performance, all the comfort and all the class of appearance of the more expensive product. This can be done without a sacrifice of any of these.

Next, the Dear Public

Next, the dear public. This fickle body wants performance first; and your engineering has seen to that. It wants looks next, so that the neighbors will envy. For this adopt a long wheelbase, and straight-line constructions. Avoid convex curves, and remember that flat space with nothing but paint upon it is monotonous. The main lines of the car must run lengthwise and a rise at the rear will add to the appear-

ance and take away from the chopped-off look. The rear end may taper to an edge—for cyclecars stub-ended behind draw up much dust. Here luggage space of the capacity of a suitcase should be provided.

Runningboards of the light steel type are inexpensive and light and can be fitted to allow better ingress and egress where side doors are not fitted. A suitcase can strap on here for tours also.

Detailing the Design

When all these things are figured and the first lay-out on paper developed, then comes the detailing. Every piece is drawn on a separate sheet, and all of standard size, so that when the blue prints are made up they can be bound in book form for shop, office and buying departments. The first drawings can be merely quick pencil sketches if desired, but carefully dimensioned and checked for correctness.

In detailing, steer clear of flanges. Use oval sections, and clean surfaces which a wipe of a rag will clean, so that the car will not be dirty in appearance, but easily cleaned. This, too, will make things look simpler. The first car castings can be made in bronze to save time, but strength should be allowed in the patterns. Use forgings where you can. Be sure of all dimensions, and all working joints should be very accurate and dimensioned in thousandths.

As the work proceeds keep a card index of every part and every blue print or drawing telling you at a glance where each part is, what its stage of development and progress and when due. Preferably build the car body and all, using only a single coat of paint, however, to prevent rust. This will develop the body with the car—and it takes time to develop a body design as well as a chassis.

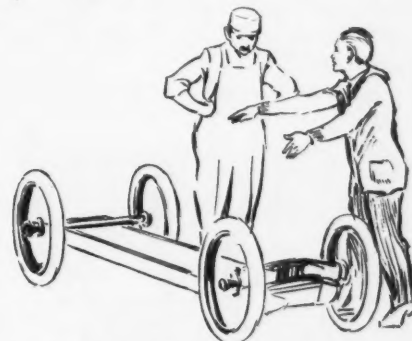
Do not get the seats too high from the floor. Eight inches is enough, but the seats must be long to support the knees, and if tandem seating, the rear seat can be 4



inches higher. The lower the more comfortable, however, and the better possible spring action.

When all is made up and put together—and the designer should assist in the work to study the problems that come up first hand—a try-out is made and there is much that is wrong. This is always the case. After perhaps a mile running, or maybe a block, the car comes in again and more changes are made. This is where the designer begins to see things. It takes an hour to take out a part for fixing that by a slight change could be removed in 5

minutes. The drawing is called in and changed for the second car, which by this becomes really accessible. The second car will be 1,000 per cent better than the first, and the third 100 per cent improvement on the second. By the time four or five cars are built they should run well and be able



It is a lot quicker and cheaper to develop a car on paper than in the piece. The greater part of the construction of a first car is done on the drawing board rather than in the shop

to do 100 miles or more a day in the hands of the factory men.

Then the first one is sold and sent out. A week, and back it comes. The dub user has discovered a fault not seen by the factory and they replace and change at no cost, thankful for the growth. So it goes, and for a year there probably will be no really developed cyclecars made in America. Yet all run well if handled right. It takes time to start a new industry.

Answers to Cyclecar Inquiries

SIDE-BY-SIDE VS. TANDEM SEATING

Advantages of Both Arrangements— Women and the Cyclecar

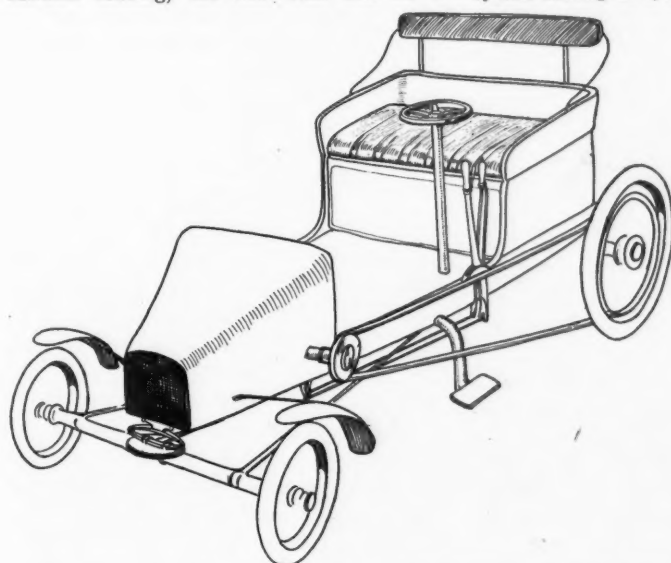
DECATUR, ILL.—Editor Motor Age—What are the advantages of the tandem and side-by-side seating in cyclecars?

2—What kind of a starter is used by the Imp?

3—Will a woman experience any difficulty in getting in a cyclecar which has no doors?

4—Do you think the present type of electric cranking and lighting systems suitable for cyclecars.—M. E. S.

1—Side-by-side seating gives greater sociability and follows standard car practice—what the public is used to seeing. Tandem seating eliminates wind resistance, and can be used with 36-inch tread, hence needing less power. It allows better springing, more pleasing body lines, and greater speed while the rolling of the wider cars is eliminated.



A cyclecar cannot succeed merely on performance. It must have an appearance worthy of its work, so that the rider may not suffer in dignity in owning one, but may feel proud of his possession. Motor buggies gave excellent performance but appearance was against them. No one will buy a box on wheels even though it run

2—A ratchet and lever type worked by cable from the crankshaft.

3—Not where there are curbstones to mount from, as is generally the case, nor if steps are fitted on running boards, so that one can take the height gradually without too high a stride.

4—The types used on the ordinary cars are too heavy and expensive. Lighting by generator of low weight is in use on several types at present in the American cyclecar market.

Blower Cooling Defined

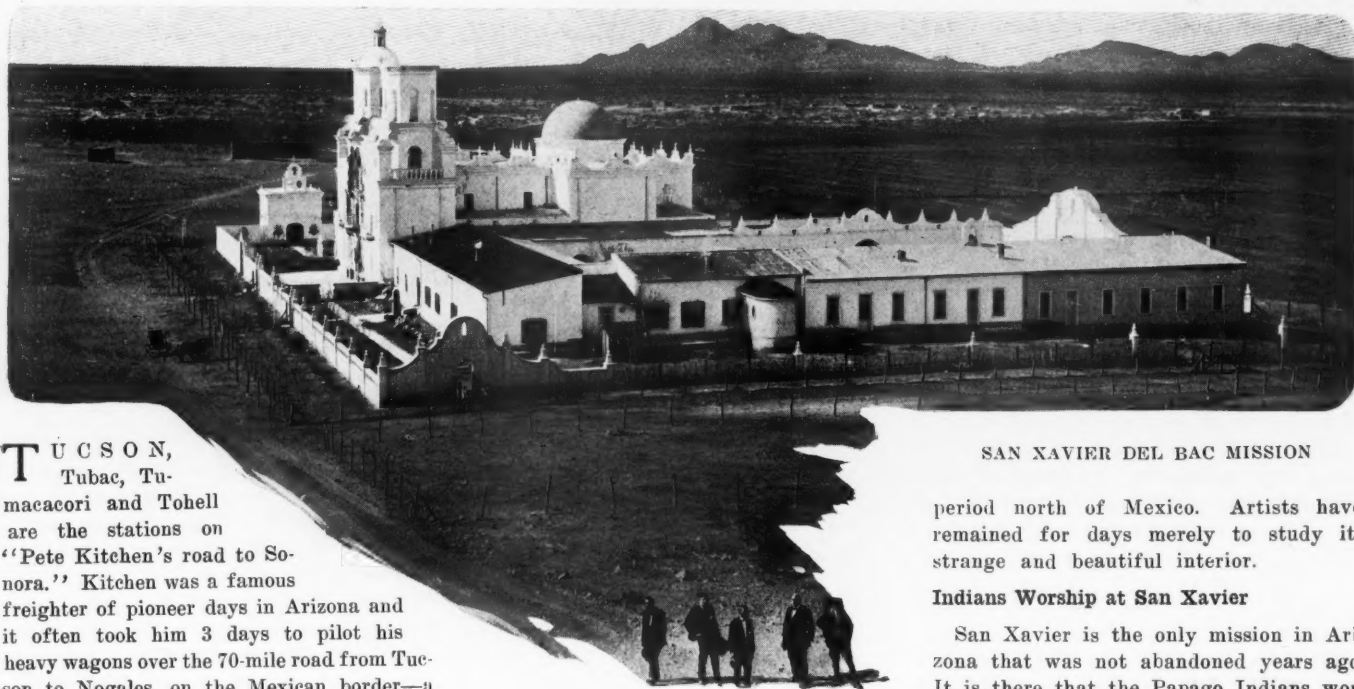
Minneapolis, Minn.—Editor Motor Age—What is meant by blower cooling of motors as differing from fan cooling? Are the terms synonymous?—J. H. T.

Practically, a fan and a blower are for the same purpose; to move air, but a fan, as the public knows it in the form of the electric fans in offices and as used behind motor car radiators, is not used for direct cooling of motors except in small sizes of engines.

In the type used for motor car cooling as in the Franklin car, the rim of the flywheel is made into sirrocco blades which throw the air outwards, sucking it in at or toward the hub and discharging it at the rim. In the so-called fan type of flywheel the air is sucked through the wheel.

Routes and Touring Information

On Pete Kitchen's Road to Sonora—Arizona's Wonderful Missions



SAN XAVIER DEL BAC MISSION

TUCSON, Tubac, Tumacacori and Tohell are the stations on "Pete Kitchen's road to Sonora." Kitchen was a famous freighter of pioneer days in Arizona and it often took him 3 days to pilot his heavy wagons over the 70-mile road from Tucson to Nogales, on the Mexican border—a road that is now negotiated with ease by a motor car in one afternoon of easy going. But in Kitchen's time there were no such things as motor cars. That old Indian dodger wouldn't have known a vibrator from a hub-cap.

All the old Spanish missions in Arizona are on Pete Kitchen's road. There are missions at Tucson, Tumacacori and Tubac, and the greatest of them all—San Xavier del Bac—is 9 miles south of Tucson. Tohell, named by some profane and humorous mule-skinner, is no more. It went out with the freight wagon.

Good Roads Lead to Missions

The best way to see the missions along Pete Kitchen's road is to go out from Tucson. Another way, if you are traveling west, is to leave the Borderland route at Bisbee and go to Nogales, 97 miles distant by way of Huachuca, then north to Tucson. Most of the Tucson-Nogales road is splendid, there being just a few sand washes to make low gear necessary, and the Huachuca-Nogales road usually is in fair shape. Stations where gasoline, oil and food—and even hotel accommodations—can be obtained are not far apart.

Anyone in Tucson can

By Ernest Douglas

direct the traveler to Escala Pura, better known as the Tucson mission, which is the smallest, most dilapidated and least interesting of the four. It is right at the edge of the city. The San Xavier mission is the one to which the tourist and sightseer is urged to go. One who has seen San Xavier will find little to interest him in any of the others. For quaintness, beauty and mysterious, historical atmosphere it rivals the far-famed Santa Barbara mission in California. As it now stands it is regarded as one of the most remarkable relics of the Spanish

period north of Mexico. Artists have remained for days merely to study its strange and beautiful interior.

Indians Worship at San Xavier

San Xavier is the only mission in Arizona that was not abandoned years ago. It is there that the Papago Indians worship the God of whom the Jesuit and Franciscan fathers have taught them. Usually the first sign of life seen upon arriving at San Xavier is a flock of fat little Papago papooses. Perhaps their fatter mothers, dressed in the gaudiest of calicoes, are somewhere about, and there may be a black-shirted, blue-overalled, sombreroed Papago watering scrawny ponies at the mission well. Visitors are admitted to the mission and shown its wonders by cowed fathers or black-robed nuns.

The mission first consisted of several adobe shacks and was founded by Father Kino, a Jesuit priest, about 1699. In 1767 the Jesuits were expelled from Spanish possessions and San Xavier came under the government of the Franciscan priests, who ever since have faithfully carried on the work begun by their predecessors.

The material used in constructing San Xavier was brick and stone, with a mortar. The secret of making this mortar has been lost, but to its use is doubtless due the mission's excellent state of preservation. Today this mortar retains the consistency of concrete.



TUMACACORI MISSION SOUTH OF TUCSON

From the Catholic Encyclopedia the following description of the interior of San Xavier is taken:

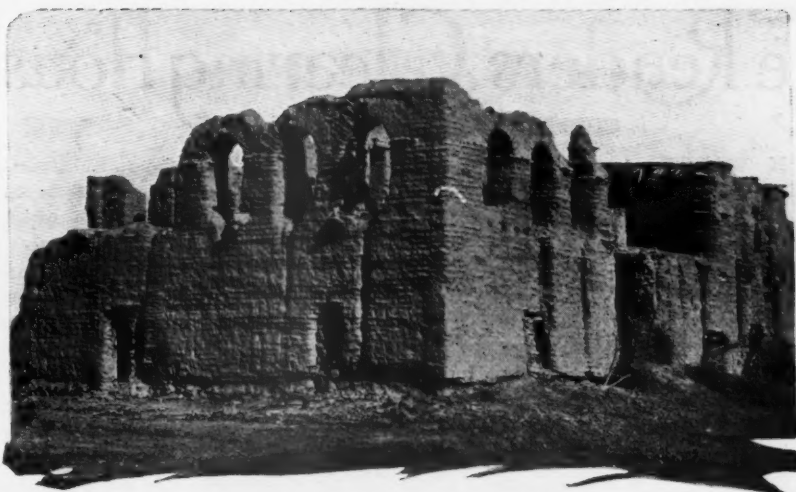
"The interior is frescoed throughout, and contains a great number of artistic statues made of wood. The reredos of the main altar and of the side chapels are elaborately decorated in bas-relief with scroll work covered with gold leaf, and are supported by columns of unique designs. Above the center of the transept a cupola rises to a height of 55 feet. Six minor domes divide the remaining space. Two figures of lions carved in wood guard the access to the sanctuary. The terraced roof is surrounded by a balustrade in masonry, each baluster tapering into a cement finial and supporting on either side a lion's head, reminiscent of the escutcheon of Castile and Leon. To the west of the church is an open cortile, the ancient burying ground, with fourteen pillars in the wall bearing niches for the stations of the cross worked in high relief. At the west end of the cortile stands a domed chapel with a belfry, used formerly as a mortuary chapel, since dedicated to our Lady of Sorrows."

Missions Attacked in Uprisings

The Tubac mission, 46.6 miles south of Tucson, is nothing more than a heap of disintegrated adobes. The Tumacacori mission, a mile or so off the direct road, is 49.7 miles distant from Tucson. It was founded by the same Father Kino, who was later to found San Xavier del Bac, between the years 1687 and 1690. The name given it was San Jose de Jumagacori, which has been corrupted in some inexplicable manner to Tumacacori.

In 1751 the Indians of Pimeria Alta revolted against their missionaries and two Jesuit fathers were killed. The pueblo was devastated and the mission abandoned. This revolt was not quelled till 1754. In 1762 the mission was again sadly disturbed by the incessant attacks of Apaches and once more abandoned. When the Apaches had been partially subdued the faithful Jesuits returned and gathered their flocks about them. In 1767 the king of Spain suddenly issued an edict expelling the Jesuits. Fourteen Franciscans took charge in 1768 and the Franciscans remained in peaceable control for 60 years. December 20, 1827, another edict was issued expelling all religious bodies from Sonora, which then included what is now southern Arizona. From that day the mission has been slowly crumbling back to the earth from whence it came.

A journey over "Pete Kitchen's road to Sonora" and a visit to the missions of



ESCALA PURA MISSION ON OUTSKIRTS OF TUCSON

southern Arizona is to penetrate the mysteries of past centuries. The imaginative tourist closes his eyes and in fancy marches with Coronado from the land of the Aztecs, without enduring those tortures suffered by the Spanish conquistadores in their expedition across snow-peaked mountains, swollen streams and

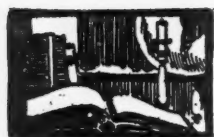
parching deserts. For the road to Sonora is a trail of romance on which the armored boots of the Castilian adventurer and the sandaled feet of the pious friar have left their imprints.

Southern Arizona is a wonderland for the tourist, a region in which to dream and speculate. Although over 2 centuries old, the walls of the missions are in an excellent state of preservation. Of what material were they built and by what master hands were they raised to so withstand the ravages of blighting

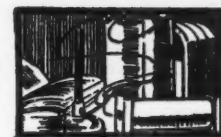
years? In the mission one sees great bells, that according to the inscriptions upon them, were cast in old Spain as early as the seventeenth century. How came these bells into this land across the Atlantic? How many holy padres dropped dead from fatigue in dragging them from Old Mexico to this new land? Quien sabe?



INTERIOR VIEW OF SAN XAVIER MISSION



The Readers' Clearing House



ENGINE USES TOO MUCH WATER Carbon in Cylinders and Scale Deposit in Water Jackets Probable Causes

SHREVEPORT, La.—Editor Motor Age—I have a Hudson 20 roadster equipped with a Bosch magneto, a B 3 Stromberg carburetor. The timing is good, the carburetor apparently is all right, and so far as I can judge the wiring is alright. There are no leaks in the radiator, and until lately used very little water. I am using wood alcohol to keep the water from freezing. The circulation is good, but still the radiator gets hot, and uses a great deal of water. What is the trouble?—W. H. Davis.

If the water is circulating properly the ignition in good order, the carburetor feeding the proper mixture and the valve timing correct there are two probable causes of overheating. The most common cause is due to carbon, which is deposited on the piston top and cylinder head. In fact overheating is one test for a carbonized motor. If the motor does not pull as well as it did formerly it is an added symptom of carbon being present. Misfiring and backfiring usually accompany this condition. If the motor is free of carbon, the overheating may be due to a scale deposit on the inside of the water jackets and radiator. This would cause the cylinders to become excessively hot and later cause boiling.

READER CANNOT START HIS MOTOR New Bearings Are Too Tight and Should Be Loosened

Chicago.—Editor Motor Age—I have a 1912 model 30 Regal which I have just overhauled, putting in new bearings. I have wired the car as per instructions, also I believe I have the carburetor set correctly. The car has no starter and I am unable to spin it by hand. Will Motor Age suggest how to start it?—George Smith.

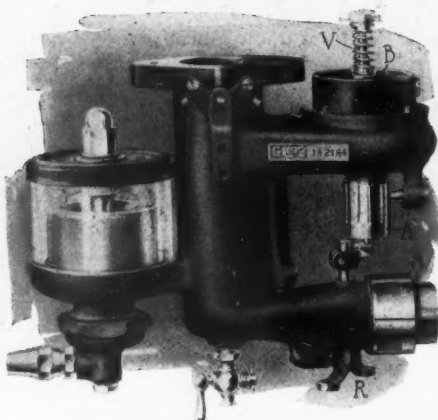
Prime the cylinders with gasoline, turn the switch to battery, throw the car into high speed and have someone sit at the wheel while the car is being pushed. If it cannot be pushed have it towed. Do not open the throttle too wide nor at any time for the first 10 hours should you race the motor. The proper thing to do after the bearings have been tightened or replaced is to operate the motor by a belt for about 6 hours. This tends to work in the bearings. It is understood that you are feeding oil in excess of the usual amount, for if this is not done the new bearings may become injured. Probably the bearings are too tight. If the above method does not help, loosen the bearings a little.

MOTOR RUNS WHEN SWITCH IS OFF Short-Circuit May Cause the Trouble— Look to Ignition

Smithville, Mo.—Editor Motor Age—Kindly explain the trouble when after driving a car for 5 or 6 miles and shutting the motor off it will backfire and make 10 or 12 revolutions before stopping, this being in the backward motion. The carbon has been scraped, and a new cowl box put on but has no effect.

2—Is an overhead valve more powerful than a T or L head?—E. P. Jenkins.

1—The trouble may be, with the switch



ADJUSTING STROMBERG MODEL G

The Stromberg type G is of the non-water-jacketed type and appears in either single or double-jet form. The gasoline adjustments for this type are set at the factory and should not be touched by the owner. There are, however, two adjustments which may require attention, these being the low-speed screw A and the high-speed screw B in the illustration above. The most important thing to watch is the clearance of spring V. With the motor at rest there should be at least $\frac{1}{8}$ -inch clearance between this spring and the nut above it. If it is less than $\frac{1}{8}$ -inch, adjust the nut B until it shows that clearance. Start the motor and let it run until the cylinders are quite warm. Retard the spark and idle the motor. If it does not operate smoothly at low speeds, turn the nut A up or down until it does. Do not turn the nut quickly, but rather a little at a time. If the motor is not operating fast enough with a given throttle opening, press the spring V slightly. If the motor speeds up, it should be given more air by turning down the nut A. If the motor slows down when the spring is depressed, the nut A should be turned up until this is overcome. So much for the low-speed adjustments.

Advance the spark and gradually open the throttle, and should the motor backfire turn up the nut B notch by notch while the motor is backfiring and as soon as the backfiring ceases stop turning the nut. If the backfiring becomes worse by turning the nut B upward, then turn it down. One can determine whether the conditions call for more or less air by slightly depressing the air valve. If the motor runs better with the valve slightly depressed, more air is needed. Do not touch the nut B when making high-speed adjustments; and if it is necessary in the double-jet type to turn the nut B to get the proper high-speed mixture it indicates the auxiliary nozzle is too small and a larger one should be substituted. In the single-jet type, if the motor is at rest and the air valve hangs off the seat after the above adjustments have been made, it indicates that the primary nozzle is too small. If the car was purchased Stromberg-equipped, the nozzles are of the correct size.

and when you think you have thrown it to the off position it may be on either battery or magneto. Look over the inside of the switch and see that all connections are tight. The fact that you have scraped the carbon does not mean the trouble will

vanish. It is not the caky carbon which causes so much backfiring, it is the small particles which become incandescent. A sticking valve may cause backfiring to take place, and at such a time as to make the engine reverse. Motor Age suggests that you examine the entire ignition wiring carefully.

2—A motor with overhead valves is not necessarily more powerful than an L-head or T-head motor, even if the dimensions are the same in all cases. The valve type is not the only factor in the power of the motor, the rest of the parts must be considered also.

RACING INTERESTS WISCONSIN MAN No Set Rule for Payment of Drivers—How They Get Their Start

Milwaukee, Wis.—Editor Motor Age—When racing for a private owner, who pays the expense and entry money and who gets the prize money, if the driver wins?

2—How do most men get their start when they want to race for a company?

3—I have a Mercer raceabout which makes 74 miles an hour. How can it be geared up to make a higher speed?—G. Wilson.

1—There is no set rule by which racing drivers are hired and most of them are on a straight salary with a certain proportion of their earnings extra. Sometimes the driver gets all the prize money.

2—Most racing drivers get their start in a motor car factory, progressing from the actual production and assembling to the position of road testing. From this point to the position of helper in a racing camp and then as a mechanic to that of driver is a logical step, and if a man makes a good mechanic, his opportunities are very good for a chance at the wheel. Some famous drivers got their start in amateur races. This is particularly easy if you own a fast car such as the one you have.

3—It can be speeded up by changing the gear ratio by advancing the valve timing, lightening the pistons and connecting rods, and taking off one piston ring. For the best speed it is necessary to fit a new camshaft with cams whose faces are designed for high speed work.

BATTERY WON'T TAKE THE CHARGE On the Bench 7 Hours—Current Source May be Dead

Cleveland, O.—Editor Motor Age—I am having trouble with my storage battery, which is down to discharging point. Have charged it 5 to 7 hours but failed to raise it a volt. How long does it take to charge a 30-cell wet battery from 110-120-volt lighting current?—F. W.

There is something radically wrong in the charging method, for a battery on charge for 7 hours should show an appreciable rise in voltage. Perhaps you think you are charging when in reality you are not. With the charging source connected to the battery, attach a voltmeter across the line and see if current is flowing. There may be no current in the line. The battery should be up to capacity after 10

hours' charging, ordinarily. The extent of sulphation determining the time to fully recharge, the figure above given is not constant. It may require 13 hours or more to bring your battery up to standard.

ELECTRIC METERS RECOMMENDED Should Be Used as a Guide for the Driver as to Battery Condition

El Paso, Texas.—Editor Motor Age—What is the weight of the 1914 Paige 36?

2—Kindly give the mileage per gallon of gasoline of this car.

3—Should a car using a magneto for ignition, but using generator and battery for starting and lighting, have a voltmeter or battery indicator on the dash, or is it unnecessary?—A Reader.

1—The Paige 36 weighs 3,070 pounds.

2—It is capable of traveling 11 to 16 miles on 1 gallon of gasoline.

3—A meter, although not necessary for the operation of the system should be used to inform the driver of the condition of the battery, i.e., whether on charge or discharge and the voltage and current rate.

LIGHTING CIRCUIT FOR CHARGING Electromagnet Operated by Dry Cells Would Not be Profitable

Warren, Ill.—Editor Motor Age—Would it be possible to recharge magneto magnets using an electromagnet with dry batteries as a source of current? If so, how many dry cells should be used and what would the dimensions of the soft iron cores of the electromagnet be, how much and what size wire? We have a 125 volt current supply. Which would be the better for this work, dry cells, or the 125-volt current? What would be the size of iron cores for an electromagnet on a 125-volt circuit, also the size of wire and amount.

2—Where could a rectifier for charging storage batteries from alternating current be obtained.—B. W. Mills.

1—It would be possible to use dry cells but it would not be economical for you have to use many cells and since recharging is not done very frequently the dry cells would deteriorate. The 125-volt lighting circuit would be best. The design of an electromagnet for 110-120-volt circuit was given in Motor Age issue of February 5, page 30.

2—Rectifiers may be bought of the following concerns: Thomas A. Edison, Orange, N. J., Electric Products Co., Cleveland, O. Westinghouse Electric & Mfg. Co., Pittsburgh, Pa., and Wagner Electric Mfg. Co., St. Louis, Mo.

TROUBLED WITH LEAKY PLUGS Cracked Porcelains Common—Replace Plug Safest Way

Brookston, Ind.—Editor Motor Age—I have a Maxwell Mercury roadster that is giving me quite a good deal of trouble and I am unable to locate the cause.

The valves are in good condition, the cylinders are alright and even the compression is good, but it misfires at times. I put on new model L Schebler carbureter and have tried numerous kinds of spark plugs. The motor seems to run in excellent manner when idle and sometimes for 6 or 8 miles, then the No. 2 cylinder stops firing. An examination showed that the plug has stray sparks around the packing glands. Taking out the plug, I found it fairly clean. What is the cause.

2—Explain the method of setting the camshaft gears on this car.—C. Kions.

1—Your trouble appears to be with the spark plugs. Interchange the plugs placing No. 2 plug in No. 1 cylinder. If the misfiring continues take the one which appears to be leaking and disassemble it.

Note if the insulator is cracked at any point. Get some new packing at a supply store and reassemble the plug. Place it in the cylinder and note if it misfires. Do not adjust the plug terminals more than $\frac{1}{2}$ inch. Slightly under is better. If the misfiring continues place a new plug into the misfiring cylinder.

2—Both camshaft gears are marked with a center punch on some tooth and this mark should register with a similar mark on the crankshaft gear.

READER REMODELING RAMBLER Will Use Lighter Pistons—Wants to Operate on Kerosene

Cambridge, Wis.—Editor Motor Age—I want some information concerning remodeling a 1908 Rambler, model 34. As the motor is so strongly built I believe that by putting in light pistons and increasing the compression to about 80 pounds I could get considerably more power out of it, and as it has a very efficient cooling system, it would not overheat. Also, by using a somewhat longer piston and having it crowned more than those now in the motor I could increase the compression to about 75 or 80 pounds, and kerosene could be used more successfully than with a motor of lower compression. Because the valves are somewhat smaller than in most of the motors of today for the same piston displacement it could withstand the higher compression without warping, or would it be advisable to get tungsten exhaust valves.

2—By installing a Harroun kerosene carburetor would I be able to use kerosene more successfully?

3—What should be the weight of the pistons? I believe 3 pounds would be strong and serviceable enough.

4—Give me the names and addresses of manufacturers of kerosene carbureters.—Howard Saunders.

1—If you are certain the cooling system can stand the change, it would be alright to try it. You would decrease vibration by using lighter pistons and with the compression increase you would get more power. You probably would have trouble starting. Tungsten steel valves have been found to give good service and from the reports of some drivers of racing cars, these valves are excellent.

2—The Harroun kerosene carburetor can handle kerosene successfully, as has been shown by a recent test on the Indianapolis motor speedway. A Henderson car now is touring the world and is operating on kerosene fed through Harroun carburetor. It would be advisable to get a special carburetor if you wish to use kerosene.

3—For the motor you have 3 pounds would be a good weight.

4—The following makers are marketing

Questions Answered and Communications Received.

W. H. Davis.....Shreveport, La.
George Smith.....Chicago
E. P. Jenkins.....Smithville, Mo.
G. Wilson.....Milwaukee, Wis.
F. W.....Cleveland, O.
A Reader.....El Paso, Tex.
C. Kions.....Brookston, Ind.
B. W. Mills.....Warren, Ill.
Howard Saunders.....Cambridge, Wis.
F. E. L.....Yale, Ia.
Stanley A. Traeger.....Minneapolis, Minn.
Maxwell Smith.....Detroit, Mich.

No communication not signed with the reader's full name and address will be answered.

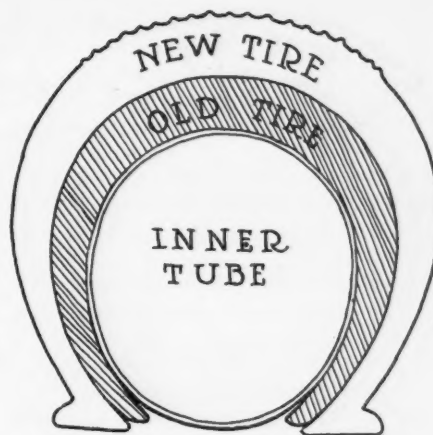


FIG. 1—A USE FOR OLD TIRES
How a reader used old shoes as a protection against punctures

kerosene carburetor: Harroun Carburetor Co., Indianapolis, Ind.; Barnard Mfg. Co., Los Angeles, Cal.; Master Carburetor Co., Los Angeles, Cal.; Wilcox-Bennett Carburetor Co., Minneapolis, Minn.; Camden Anchor Rockland Co., Camden, Me.

WHAT IS FUEL CALLED NAPHTHA? Covers a Wide Range of Distillates—Includes Gasoline

Yale, Ia.—Editor Motor Age—Is it possible to use naphtha to increase the grade of gasoline, and if so what proportion should one use to 5 gallons of gasoline?

2—Is it liable to injure the engine in any way and is it dangerous to use?—F. E. L.

1—The term naphtha covers a wide range of petroleum distillates, and the chances are if you went to a shop to buy naphtha you would get gasoline, or a hydrocarbon very nearly resembling it. The naphtha usually referred to is a fuel of slightly lower gravity than gasoline. You may use any proportions of what is sold to you as naphtha.

2—No more harm would result than if you used gasoline as we know it.

TROUBLED WITH A SMOKY MOTOR Blue Smoke Result of Too Much Oil Getting Above the Piston

Minneapolis, Minn.—Editor Motor Age—What is the trouble with my car? After it came out of the shop I noticed blue exhaust whereas before I could see none. Is the mixture too rich? If so, tell me how to adjust the Stromberg carburetor fitted on a 1-ton Kissel truck.—Stanley A. Traeger.

1—The smoke probably is caused by an excess of oil in the cylinders. After a motor has been overhauled and the bearings tightened or refitted it is proper to supply an excess of oil until the bearings are run-in. Blue smoke hardly is caused by the fuel, the latter usually showing black or gray smoke. The adjustments of the Stromberg carburetor are given in this issue in this department.

Old Tires Inside New Ones

Detroit, Mich.—Editor Motor Age—I have been using old tires inside my new ones and have not had a puncture for 4,000 miles. I take an old tire and cut off the bead and then place the old tire inside a new one and the inner tube inside the old tire as shown in Fig. 1.—Maxwell Smith.

The Accessory Corner

Quickwork Rotary Shear

ROTARY shears which do the work of many band saws, it is claimed, are being marketed in many styles and sizes by H. Collier Smith, Detroit, Mich. The Quickwork shears are designed for use by body builders and other workers in sheet metal and are capable of cutting light and heavy gauge steel in irregular and reverse curves of various sizes, depending upon the size of the shear. The latest type introduced is the No. 3 shown in Fig. 1 at 5, which cuts 3-16 inch steel or that of lighter gauge. It cuts irregular curves of 3-inch radius without cutting in from the side of the sheet, which not only saves metal, but makes the operation speedier. The maker of this shear, is marketing also bending, rolling-in, edge-turning machines, etc.

Hans Reserve Oil Outfit

The latest addition to the Hans line of motor car accessories is a reserve oil outfit which enables the owner to carry sufficient lubricant in the car for a long trip. The feature of the outfit, shown in Fig. 1 at

3, is that the crankcase may be supplied with oil by forcing it from the reserve tank, without moving from the seat, the system being somewhat on the order of the pressure systems used on racing cars. A hand pump is provided for forcing the oil to the crankcase. An added feature is that oil may be bought in bulk and thus the owner saves money. The Hans reserve outfit will be especially desirable for the great number of Ford owners who wish to convert their cars into speed vehicles. The apparatus is sold for \$10 by the Hans Motor Equipment Co., La Crosse, Wis.

Lee Vanadium Tires

Most of us know that the metal vanadium is used for making steel tougher, but to cause rubber to show greater toughness by treatment with vanadium, is something new. The Lee Tire and Rubber Co., Conshohocken, Pa., has experimented with vanadium as a rubber stringent with the result that the concern is now marketing tires made of what is called vanadium rubber. The Lee company has found that the treatment of tire rubber with this

metal increases the wearing qualities of the rubber, makes it more resilient and on the whole makes it more adaptable for use as tire material, than ordinary rubber.

Smith Duplex Lamp

A lamp which combines both a dashlight and trouble light and known as the Smith Duplex is announced by J. W. Andrews & Co., Chicago. The lamp is fitted into a socket in the dash, and, when required as a trouble lamp, it may be removed quickly and carried the length of the car. There is sufficient lamp cord on a spool placed behind the dash to permit this. The Smith lamp complete with instruction which will enable the owner to install it, sells for \$4.75. It is shown in Fig. 1 at 2.

Dressel Taillight

An oil lamp made of steel is the latest development in Dressel lamps made by the Dressel Railway Lamp Works, New York. This lamp, shown in Fig. 3 at 1, has a specially designed burner employing a round felt wick, and gives a steady light of about 1½ candlepower. The base in

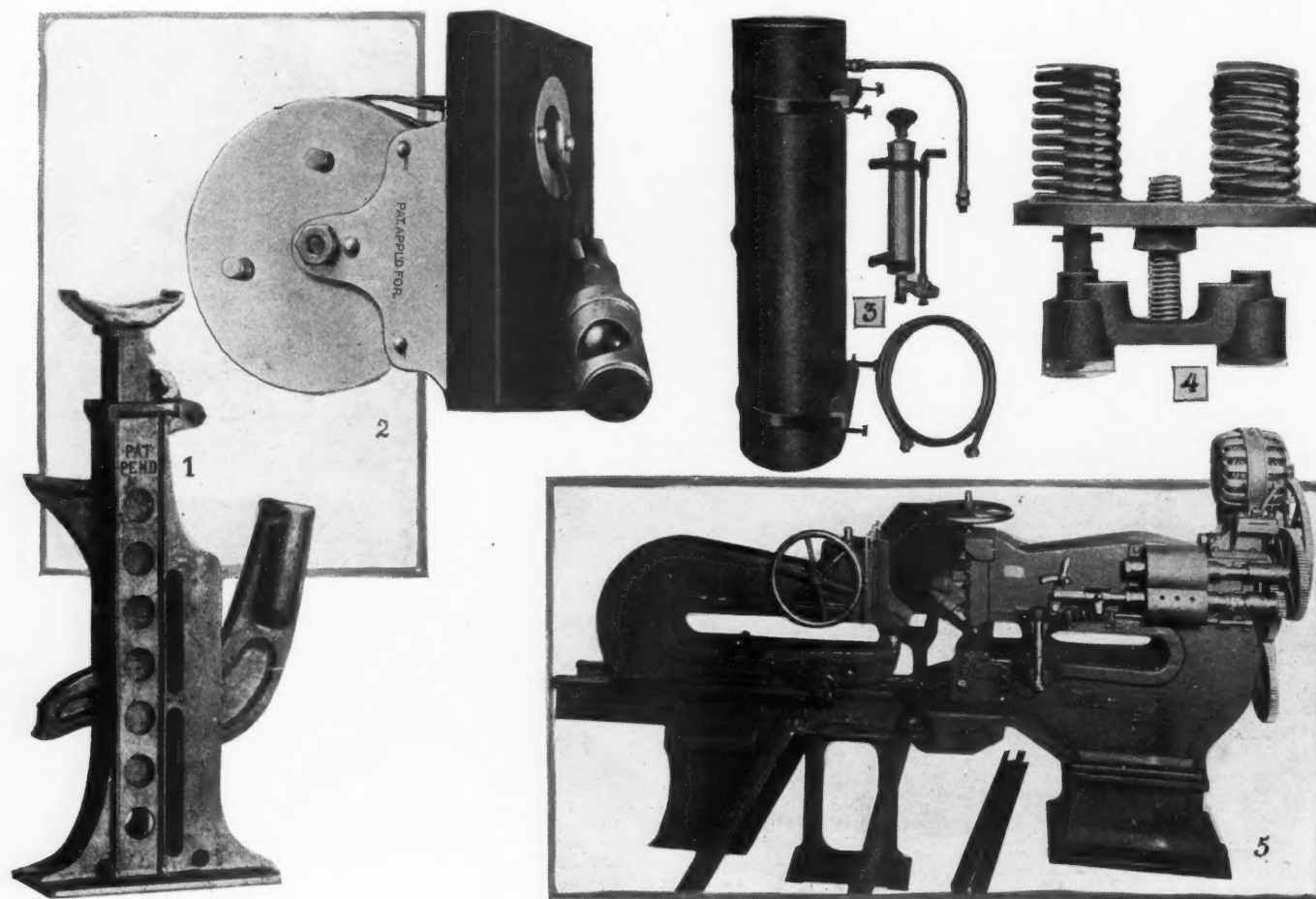


FIG. 1—FIVE ACCESSORIES OF INTEREST TO THE MOTORIST AND REPAIRMAN

1—Quick-lifting cam jack which has a maximum lift of 18 inches; 2—Smith duplex lamp which may be used as a dash light or trouble light; it is removable easily and quickly from the socket and when pulled out may be made to catch like an ordinary shade; 3—Hans reserve oil outfit which stores oil in a reservoir to be pumped into the crankcase whenever desired, without the driver moving from his seat; 4—Perfect valve spring lifter for Ford cars which lifts two valve springs at once; 5—Quick-work rotary shear which does the work of many band saws

which the oil pot rests is hinged to the body of the lamp and is fastened by a patented spring catch. The light is projected through convex lenses.

Wixon Manifold

Claiming that the overlapping of the suction impulses in a six cylinder motor cause some cylinders to get more fuel than others, the Imperial Brass Mfg. Co., Chicago, has brought out a manifold for sixes which is said to cause to be fed to each

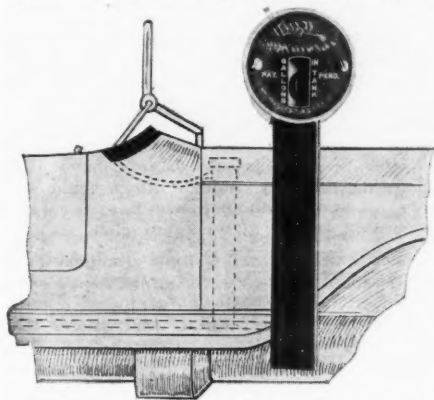


FIG. 2—JUNIOR GASOMETER FUEL GAUGE
Designed for cars with cowl fuel tanks. The dotted lines in the illustration show how the gauge is attached

cylinder, the proper amount of fuel and that one cylinder will not rob another.

The manifold is of the Y type, each arm of the Y feeding to three cylinders, as shown in Fig. 3 at 2, and a separate throttle controlling each set of three cylinders. The throttles operate simultaneously, but since none of the first three cylinders overlap, it is claimed each cylinder will receive the proper amount of mixture. In this way a smoother running, and more powerful motor is obtained, the maker states. The manifold was designed by H. H. Wixon of the Imperial Brass Co.,

which now is in a position to furnish the manifold for both old and new cars.

Holden Tire Tools

The Holden Mfg. Co., St. Paul, Minn., announce a tire tool which is designed especially for demountable rims which are not quick detachable. It is stated by the maker that the tool will loosen the bead with little effort even if the rim has become rusty. The tool shown in Fig. 3 at 3 is adapted to 3½ to 5-inch tires, and sells for \$1.25. In operation the tool loosens a rusted or frozen tire by forcing the bead inward and holding it in a fixed position while a screwdriver or similar tool is placed under the bead. A special Holden tool for Ford cars sells for 95 cents.

Quick-Lifting Cam Jack

The Four-Wheel Auto Jack Co., Reading, Pa., announces a quick-lifting jack utilizing the cam principle, and which will support a weight of 6,000 pounds. A single push on an extremely long lever lifts the load 2 inches and at its maximum capacity lifts to 18 inches. The release of a pawl releases the load instantly. The jack shown in Fig. 1 at 1, sells for \$3.

Junior Gasometer

The latest development in tank gauges from the factory of Oliver C. Ritz-Woller is the Junior Gasometer, a device for cars with cowl fuel tank, which tells at all times the amount of gasoline in the tank. The system comprises a float tube, a gauge and flexible shaft to the gauge. As shown in Fig. 2, the float tube taps the gasoline line and connected to the tube is a flexible shaft which operates the indicating mechanism. The illustration shows the indicating face. The price of the Junior Gasometer is \$5.

Glyco Skeleton Bearing

Joseph T. Ryerson & Son, Chicago, is

marketing a unique type of plain bearing, for connecting rods and crankshafts, the new construction being called the Glyco Skeleton from the fact a steel or bronze skeleton, as shown in Fig. 4 is imbedded in the babbitt metal. The skeleton grips the babbitt so that the latter is held at almost every point making a bearing which appears to offer great resistance to distortion. In comparing the new bearing with the conventional babbitt type, the maker states a blow from a hammer may

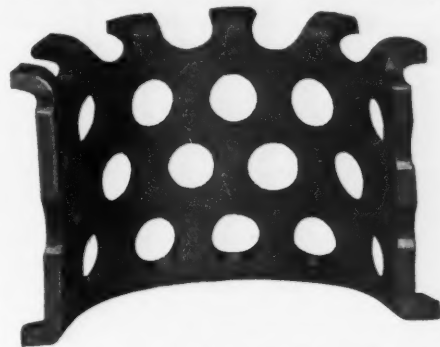


FIG. 4—GLYCO SKELETON BEARING
The skeleton shown is imbedded in the babbitt making a bearing which offers great resistance to distortion, it is claimed

crack the ordinary bearing while the Glyco flattens or bends.

Perfect Valve Spring Lifter

A device for lifting the valve springs of a Ford car so that the valves may be removed easily has just been announced by Winton L. Smith, Newark, N. J., the feature of which is that it lifts two valve springs at once and leaves the operator's hands free. Its construction is similar to that described in Motor Age a few weeks ago, designed especially for Winton cars. In Fig. 1 at 4 is shown how the spring lifter supports the valve spring when the valve itself has been removed. The valve at the left in the illustration requires only the removal of the spring support. The lifter together with all the necessary tools and materials for grinding the Ford valves is sold for \$2.

Smith Tire Valve

An easy-pumping tire valve known as the Smith is announced by the Smith Tire Valve Co., Boston, Mass., which relieves the man at the pump of the trouble of forcing the ordinary valve open against internal air pressure. With the Smith valve in place of the ordinary Schrader valve, it is claimed a tire may be inflated without any perceptible effort on the part of the operator. The valve is screwed into the valve stem of the tube and is removed each time a tube is taken out. A set of 5 valves sell for \$2.

Crone Vaporizer

F. G. Crone, Buffalo, N. Y., is marketing a primer which has an electrical heating unit, operated by a battery which vaporizes the fuel as it passes to the intake manifold. The device besides making starting easier, enables the motor to operate on kerosene.

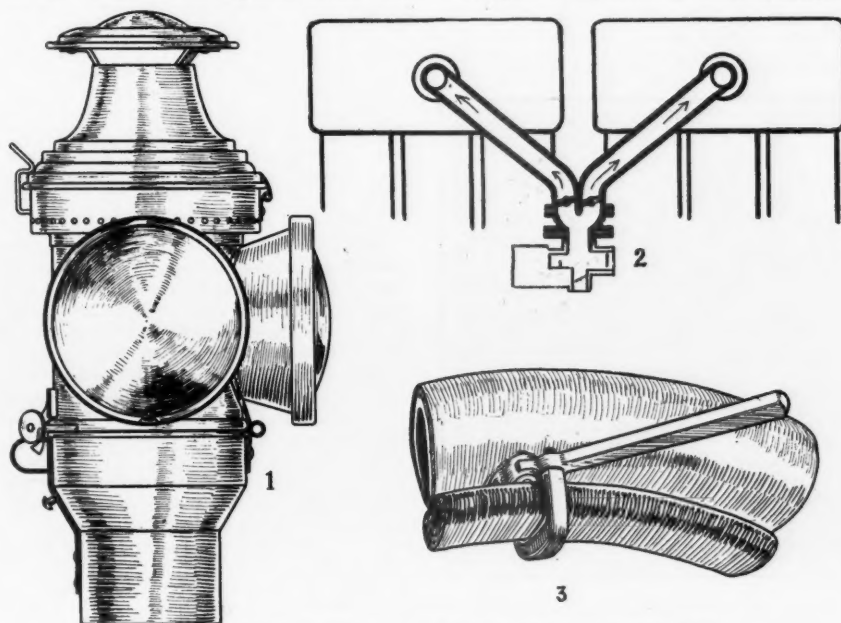


FIG. 3—THREE RECENT ACCESSORIES BROUGHT OUT

1—Dressel taillight which is made of steel; 2—Wixon intake manifold for six-cylinder motors, which causes each cylinder to get the same amount of fuel by preventing one cylinder from robbing another; 3—Holden tire tool which makes tire removal easy even if the tire is frozen or rusted to the rim



From the Four Winds



OVER 6,000 Cars in Montana—There are now registered with the secretary of state in Montana 6,103 motor cars and commercial vehicles.

Cyclecar Used Upon Stage—At a minstrel show given at Tulsa, Oklahoma, by the local lodge of Elks, an Imp cyclecar was used in one of the acts. This without any question is the first time in the history of the industry that a cyclecar was ever used upon the stage as a prop.

Hans Wagner Buys Cyclecar—Hans Wagner, short stop of the Pittsburgh Baseball team, has been bitten by the cyclecar bug, and has negotiated with C. N. Leet of Pittsburgh, Pa., the state agent for the Imp cyclecar, for immediate delivery of a cyclecar which he desires to take south with him for use around the training camp of the Pirates.

Fortesque Goes South—Secretary James Fortesque of the Massachusetts State Athletic Association has gone on a trip to the West Indies in search of health. For more than a year he has been ailing and his physician told him a few days ago that it was imperative that he should go south to recuperate after his last serious illness.

Favors Convict Labor on Roads—H. H. Holmes, a student of Columbia University, New York, has attracted some attention by declaring his candidacy for the senate of Alabama on a platform opposed to the convict lease system and advocating the development of convict road work. From a child he had heard of the unfortunate leased convicts and his greatest ambition is to better their conditions.

Henry Joy Touring in Southwest—A month's tour over the rough going in the southwest has been started by Henry B. Joy, president of the Packard Motor Car Co. The trip is being made in a touring car, which carries special camping equipment. Mr. Joy is accompanied by O. E. Hunt, assistant chief engineer. During the entire trip the men will be independent of civilization, except when making stops for supplies. The car is provided with extra large gasoline and water tanks. By means

of side and rear curtains, the body can be entirely enclosed. The car carries a complete camping outfit, including an alcohol stove, tent, sleeping bags, cooking utensils, food bags, airtight tin cans, electric lights and lanterns.

Texans Form Motor Club—The Big Springs Automobile Association has been formed by motor car owners of Big Springs and Howard county, Tex. S. L. Bacon has been elected president and R. J. Compton secretary and treasurer. The new association has started a movement to secure the right of way for motor road to Stanton, in the adjoining county of Martin.

Optimistic Over American Roads—President John A. Wilson of the American Automobile Association, just home from a business trip abroad, asserts that America need no longer go to Europe for instruction in road improvement. While admitting the highways systems in France and England provide adequately for the multiplying passenger and freight traffic that has resulted from the coming of the motor-driven vehicle, Mr. Wilson expresses the belief that the present attention by congress to the roads question ultimately will result in a network of roads communication which will cover the entire country.

Chase Runaway in Motor Car—In Detroit the other day a bit of real drama took place which was an amusing and exciting illustration of the victory of the motor car over the horse in their modern battle for supremacy. A motor fire apparatus, its siren wide open, started the trouble. It came racing into the downtown district, followed closely by a frantic horse which it had frightened. The horse had lost its wagon and was running with pieces of broken harness and one shaft dragging behind it. The fire apparatus turned off on a side street, but the runaway kept straight on. Over downtown crossings he ran, and behind him, dodging in and out of traffic, came a Paige-Detroit roadster. A traffic policeman lay face downward on the roadster's left fender, holding on by the headlight bracket while the driver broke city speed records in an effort to catch the flee-

ing horse. For half a mile the chase lasted, the horse dodging each time the car was jockeyed close enough for the policeman to catch one of the dangling reins. Finally the end of a rein was reached, the car gradually slowed down, and the horse stopped.

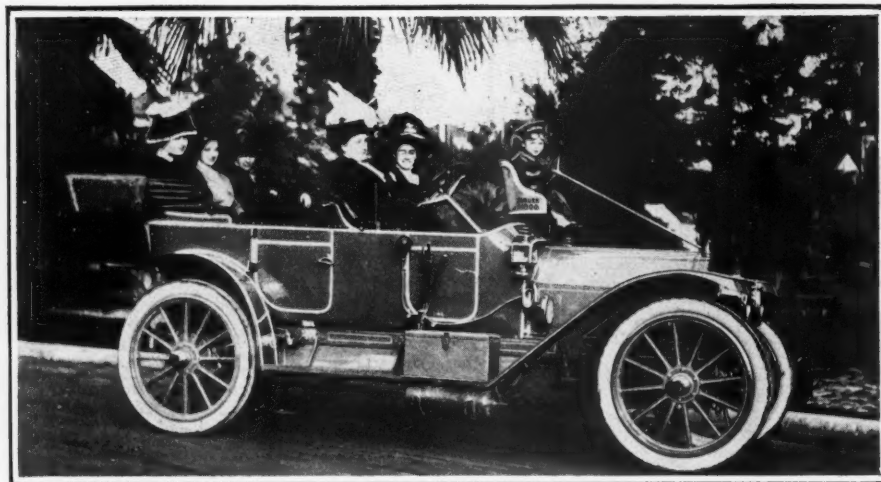
Will Regulate Taxicab Fares—Indianapolis officials expect to take up the question of preparing a taxicab ordinance. The city has never attempted to regulate the taxicab fares. The large motor liveries, as a rule, have charged reasonable prices, but some of the "curb" taxicab drivers have been charging all they thought they could get. The proposed ordinance will base the fares according to the distance traveled.

Trucks to Cross Bolivia Ranges—Four White motor busses were purchased recently by a Bolivia transportation company, operating a line between Potosi and Suere, that will be operated at an altitude of 17,000 feet. The two terminals of the line are separated by a mountain range whose only pass is considerably higher than the tallest peak on the North American continent. Although not long, the run consists of a constant grade with many steep pitches.

Sioux City Seeking Entries—E. R. Schultz, secretary of the Sioux City Automobile Racing Association, is expected back from Santa Monica this week with a number of entries for the meet to be held on the Sioux City speedway for 5 days this summer, starting June 30 and closing with a 300-mile contest July 4. Purses amounting to \$32,000 have been guaranteed and \$25,000 will be hung up for the feature event. As soon as the frost leaves the ground, work will be started getting the speedway in shape for the meet.

To Improve Texas Post Road—By the direction of Postmaster General Albert S. Burleson, the allotment for the improvement of the San Antonio-Austin road, designated as one of the Texas post roads to be improved with the aid of government funds, has been increased from \$30,000 to \$40,000. The inspection of the road has been completed by J. R. Shidler, government highway engineer, and he will soon make his report to Washington. It will be based on a 24-foot roadway, with a 15-foot surface. Gravel will be used on most of the road. In addition to the government allotment, the state and the counties to be traversed will contribute \$30,000.

Wild Drive Saves Child's Life—Driving 2,500 miles under the most trying conditions, but making a record in the line of low fuel consumption and minimum repair bills, as well as saving a child's life, was the novel performance of Victor Fairchild, a motorist of Whittier. Young Fairchild's chance to be a hero came just after he had crossed the line dividing California from Oregon. In the midst of a lonely stretch, the road on which he was traveling being as dangerous and rocky as possible, he came across a homesteader and his wife who were bemoaning their fate. Their little baby boy had been taken suddenly ill, and they were at their wits' end to reach the doctor, many miles away across precipitous mountains. Mr. Fairchild volunteered to make the trip. Mother and child were loaded into the machine and the long, wild ride over a discarded pack trail was commenced. The mother kept urging Mr. Fairchild to greater speed until he was sending his car over the strange and forbidding road at a perilous



SEATED over the dash in a tiny seat of his own, a young motorist of Los Angeles is the center of interest whenever he takes an outing, and that is once every day, for he is an enthusiast in the sport. He is supplied with a steering wheel of his own, which he can operate to his heart's content, as it does not affect the course of the car; but it gives him a feeling of importance and keeps him out of mischief. Dressed in a complete motorist's costume, with goggles, gauntlets and duster, he is in every detail an up-to-the-minute chauffeur.

pace. The car stood up to its task nobly and Mr. Fairchild was rewarded at the end by knowing that the doctor was able to save the child's life by emergency treatment administered just in time.

Women Form Motor Club—Billings, Mont., has a full-fledged woman's motor club, formed last year and ready to take an active part in this year's campaign for better roads.

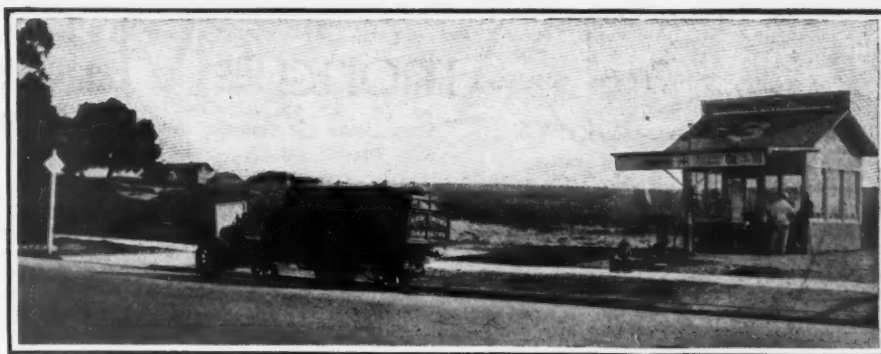
Boosting Good Roads in Montana—Though it is of comparatively recent origin, the Montana State Automobile Association, of which E. P. Mathewson of Anaconda is president, is a potent factor in the campaign for better roads in Montana. There are now fourteen motor clubs in the state which are associated with the state association.

Blames Ancestors for Car Theft—The ancestors of Robert White of Pittsburgh, who appeared in Judge Swearingen's court recently, were fond of speed, so Robert told the court in making a defense when charged with "borrowing" a motor car belonging to Harry Dangerfield. Robert said that his parents has endowed him with the insatiable desire for fast traveling on pneumatic tires, but had bequeathed him nothing with which to satisfy his craving. So White has been unable to control his impulse to go racing about the boulevards in borrowed cars. Judge Swearingen put White under oath to remain away from the lures of the motor for 1 year and paroled him.

Pittsburgh Restricts Parking Time—Beginning February 27, the police of Pittsburgh inaugurated a campaign against motor car owners who use the downtown thoroughfares as parking spaces or garages. The city council has established a restricted district, which comprises practically the entire downtown, or high-pressure fire district. Within these limits a car must not stand longer than 30 minutes. Violation of this regulation entails a fine. The streets are very narrow and several times the fire department has been hampered by cars standing in the downtown district. The motor club is co-operating with the police in curing the habit of some owners who continually clutter up the streets with their machines when there is plenty of parking space for rent at reasonable prices in the heart of the downtown business district.

Motorists Assist Aurora Police—Mayor Thomas Sanders and Chief of Police Michels of Aurora, Ill., are anxious to have the motor car owners of that city co-operate again this year in rounding up persons who violate the traffic laws. Last year a score of the leading car owners of the city, facetiously known as the \$3,200,000 police force of Aurora, agreed to assist the regular police force. They were responsible for many arrests and convictions of those who ignored the laws of the city and state. It has been decided to hold school and invite all of these citizen policemen to attend. Chief Michels will discuss three subjects as follows: "Arrest;" "When arrests should be made;" and "When arrests should not be made." Mayor Sanders and Chief Michels complimented the car owners of last season upon their excellent judgment and good service in the war against the reckless motorist.

Paroled Convicts for Road Work—Governor O. B. Colquitt of Texas has signed the paroles for the fifty convicts to work in the Lindale road district of Smith county, where the use of convicts for road work without guards, shackles or stripes will be tried for the first time in the state. All of the men paroled are white, between the ages of 20 and 26, and with short terms of 5 years or under. R. G. Christian, the road engineer who will be in charge of the work in Smith county, states that a number of inquiries have been received from different counties in the state regarding the use of convict labor, and statements made that bonds will be



A LONG most of the main thoroughfares radiating from Los Angeles, a city of many motor cars, may now be found supply stations identical with the one shown in the illustration. They are uniform in color as well as design, being painted red, white and blue, and by night are brightly illuminated. The plan of locating supply stations at points that are in the stream of motor traffic, yet too far from town to be good garage sites, has been demonstrated to be a profitable commercial idea.

voted if the convict labor proves a success; also that where bonds have been issued their expenditure is being withheld pending the demonstration to be given at Lindale. A number of counties are planning to send representatives to Lindale after the work is begun to observe the work and methods used.

Promoting Motor Car Toll Road—John B. Christenson of Glen Rose, Tex., president of the Texas Motorway Co., is promoting the construction of a road from Glen Rose to Waco to be used by motor trucks for passenger and freight traffic, and a toll road for motor cars. The distance between Waco and Glen Rose is 100 miles and the cost of the road is estimated at \$6,000 per mile. The road has already been built from Duffau, in Erath county, within 7 miles of Glen Rose. Waco has been asked to subscribe \$100,000 worth of bonds, or give a bonus of \$500 per mile of road.

Built Motor Car in 1784—"There is no question but the first motor car was built in 1784 by William Murdock, a Scotchman, a friend, associate and assistant of Watts," says President W. H. McIntyre of the Imp Cyclecar Co. of Auburn, Ind. "Murdock invented many features of the steam engine. He built the first oscillating engine and produced a high pressure engine for use as a tractor. This was the first known type of motor car and it was in 1784 that he produced this model. He discovered and found mechanisms to utilize high pressure air and the vacuum; the rudiments of the air brake and the pneumatic gun may be found in his list of inventions. He is better known to history, however, as the inventor of the process to utilize coal gas as an illuminant and fuel. This Edison of the sixteenth century lived to be 85 years old."

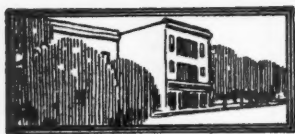
Michigan Reports Record Registration—Secretary of State F. C. Martindale of Michigan has received up to February 1 the sum of \$154,612 for motor car license fees. This total receipt for 1 month of 1914 is almost as large as the total receipts for the 12 months in 1913, which were \$190,328.75. Under the new system of taxing the machines according to horsepower, 12,178 owners have secured licenses, including 1,068 electric vehicle owners. The number of chauffeur licenses issued up to February 1 was 2,000; motorcycle licenses, 604; and dealers, 154. The amount received from dealers' licenses was \$14,410 and varies from \$50 to \$1,100 for each license. The average fee for registration of owners is \$11, and eliminating electrically driven vehicles, licenses for which cost much less than the gasoline cars, the average fee is \$12. During 1913, 54,366 cars were registered and anticipating that at least 60,000 machines will be registered this year, it is estimated that not less than

\$750,000 will be received by the state for the registration of motor vehicles and chauffeurs.

Work on Yellowstone Park Roads—Although work on the roads within Yellowstone National Park to permit the use of motor cars there is being pushed along, no change in the rules regarding motor cars will be made this season. In only a few places in the park are the roads now suitable for use by both motor-driven and horse-drawn vehicles, but large appropriations for road work within the park have been made, and the motorists will soon have an opportunity to drive through the wonderland of North America.

Nominates Officers for 1914—At a meeting of the Chicago Automobile Trade Association last week, N. H. Van Sicken, president for the past 3 years, declined renomination, claiming that his speedometer business required all his were nominated: President, H. M. Allison, manager of the local Packard agency; vice-president, C. W. Stiger, of the Stromberg Motor Devices Co.; secretary, D. E. Whipple, of the local Detroit electric branch; treasurer, Henry Paulman, Chicago Pierce-Arrow representative; directors, H. C. Tillotson, of the Stromberg Motor Devices Co., and Ralph Temple, president of the Ralph Temple Automobile Co. The election will be held March 9, to be followed by a banquet.

Oldfield-Fisher Feud May Be Revived—Should Barney Oldfield captain the Mercer racing team this season and enter the 500-mile race, as is persistently rumored, the feud between the veteran and Carl G. Fisher, owner of the Indianapolis speedway, which at one time resulted in the former's banishment from the track, promises to be revived once more. Oldfield and the speedway magnate fell out in 1911, when the driver's erstwhile manager, Bill Pickens, said several hard things about the speedway and organized racing in general, pursuant to Oldfield's disbarment from the A. A. A. for racing against Jack Johnson on a dirt track at Brighton Beach. The upshot of the matter was that Fisher swore Oldfield would never drive on his track again, a promise made good later when a proposed match race between Barney and Burman was called off on this account. Since then three 500-mile races have been run, with Oldfield never a contender in any of them. True, Barney has been present at the ringside, once in the role of relief driver, but never has he been accorded the privilege of actually taking the wheel. The question of the hour, therefore, is, will precedent be waived on the occasion of the next 500-mile race and the ban set aside, in the event he enters as a member of the Mercer team or will they not?



Among the Makers and Dealers



ORDERS Train Load of Westcotts—Rowe, Young & Cooley, Chicago representatives, have ordered a trainload of twenty touring cars from the Westcott Motor Car Co. of Richmond, Ind.

Cain Leaves McCord Company—James W. Cain has resigned his position as chief engineer of the McCord Mfg. Co. of Detroit to engage in the railway supply business at Houston, Tex. He has been succeeded by Howard Greer, Jr.

Seattle Makers Christen Cyclecar—Daniel Murray, president, and George L. Grant, manager of the new cyclecar plant in Seattle, Wash., have christened their product the Columbia cyclecar. This car will have a two-cycle engine and will accommodate two passengers.

Not Interested in Cyclecar—Officials of the Mercury Mfg. Co. of Chicago, maker of a 1,000-pound delivery wagon for the past 4 years, announces that it is not interested in the manufacture of the Mercury cyclecar. The Mercury Mfg. Co. has received considerable mail concerning cyclecars recently.

Dayton Company Increases Capital Stock—Papers have been filed with the secretary of state increasing the capital stock of the Dayton Rubber Mfg. Co. of Dayton, O., from \$150,000 to \$1,000,000.

Wheel Company to Move—The Ideal Steel Wheel Co. of Cincinnati, O., soon will be moved to Elkhart, Ind. The desire is to get closer to the Detroit market. The new officers of the company are O. G. Harrison, president; E. H. Maffey, secretary and treasurer, and T. B. Mills, general manager.

File Suit Against Maxwell—The Maxwell Motor Co., a Delaware corporation, has been made defendant in a suit filed in the United States district court for the district of Delaware, by Howard A. Howard and John C. Howard, trustees under the will of Sarah J. Howard, all of Illinois, in which

they allege that \$16,000 is due as rent on a property in Chicago which is involved in a controversy that dates back to the merger with the United States Motor Co.

To Make Tires in Mexico—Jose Teodoro Diaz Gonzales has applied to the department of foment of the Mexican federal government for a concession to build a plant to manufacture tires, tubes, and other articles in which rubber, gutta percha and similar substances are used, the plant to be located in the City of Mexico. The application is made under the law for the protection of new industries.

Bid for Gallion Truck Company—The citizens of Gallion, O., have made a proposition to the courts for the purchase of the assets of the Cleveland-Gallion Motor Truck Co. of Gallion, O. W. J. Geer, representing the syndicate, bid \$23,000 for all of the property, of which \$2,500 is to be paid on approval of the proposition, \$2,500 on delivery of sufficient bill of sale and the remainder at the rate of \$2,500 every 30 days.

Calls for Kastner Bids—Frank M. McKey, receiver for the Kastner Tire and Rim Co., 2101 Michigan avenue, Chicago, announces that all bids on the personal property of the concern will be received up until 9:30 o'clock on the morning of March 10. All bids must be accompanied by a certified check for 25 per cent of the amount bid.

Schedule Baseball Sales Contest—Almost simultaneously with the departure of major league ball teams for the south, twenty-one Packard truck sales managers, gathered by telegraph from coast to coast, assembled at the Packard Motor Car Co., Detroit. They came to attend the truck sales convention and to get inside dope on the Packard Truck Baseball League, which begins its season March 1. This league is a novel idea in sales contests. It consists of ten teams, which meet each other three times during the "season." The organization is complete

from a national commission down to the bat boys. Sales count as runs. The winning organization will be awarded a pennant and a \$500 bulldog.

Gramm Name Is Protected—Chancellor Boyd has ruled in favor of the Gramm Motor Co., in its suit against Fisher & Co. of Walkerville, Ont., to restrain that company from making use of the word "Gramm." The defendant company maintained that the word "Gramm" was in general use in the trade to designate a certain truck which the defendant company as well as the plaintiff manufactured. A perpetual injunction was granted to restrain the Fisher company from making any use of this word.

Invents Garage Oil Pump—H. N. Rothweiler of Seattle, Wash., has invented an oil pump which is being manufactured in Seattle for the market. The pump is fitted to a barrel by boring a hole in the head and is fastened securely to the bottom by means of a pointed brad. It holds the tube firmly in place and keeps the screen about 3/16 of an inch from the bottom. The Rothweiler pump not only saves room in the garage, but eliminates the waste of costly lubricating oil, as is frequently the case where barrels are turned on a side and the contents emptied by means of a faucet.

Peerless Making Fire Apparatus—The Peerless Motor Car Co. recently has undertaken the manufacture of a complete line of fire apparatus. About \$100,000 worth already has been sold to Cleveland, Lakewood, East Cleveland, Mansfield, and other Ohio towns. The latest addition to the Cleveland equipment was a motorized steam pumping engine. By adoption of new principles the Peerless company has succeeded in mounting the old horse-drawn vehicles on a chassis that has a sufficient wheelbase and width of tread to attain high speed with perfect stability. The remodeled engine has been put into service at the Woodland avenue and East 79th street

Ardmore, Okla.—Ardmore Refining Co., capital stock, \$30,000; incorporators, J. B. White, J. S. Alexander, W. C. Brissey.

Boston, Mass.—Charles Motor Co., capital stock, \$25,000; incorporators, V. A. Charles, R. H. Sherman, W. B. Kittredge.

Boston, Mass.—Akron Tire & Rubber Co., capital stock, \$21,000; incorporators, M. Laserson, I. Barry, C. Braunstein.

Boston, Mass.—National Garage Co., capital stock, \$5,000; incorporators, E. Partridge, W. D. Partridge, F. P. Anthony.

Brooklyn, N. Y.—E. G. Stache's Sons, capital stock, \$6,000; to deal in motor vehicles; incorporators, R. E. Stache, E. E. Stache, O. G. Stache.

Brooklyn, N. Y.—Montauk Auto Sales Co., capital stock, \$5,000; incorporators, L. F. Ohse, P. Ottati, W. F. Campbell.

Buffalo, N. Y.—Amper Control Corp., capital stock, \$100,000; to manufacture and deal in motor accessories; incorporators, E. W. Jones, R. E. Heard, L. C. Kinnus.

Buffalo, N. Y.—Mogul Truck Co., capital stock, \$3,000; incorporators, O. J. Reickert, A. F. Reickert, E. M. Reickert.

Buffalo, N. Y.—Mogul Truck Co., capital stock, \$3,000; incorporators, E. M. Reickert, O. J. Reickert, A. F. Reickert.

Buffalo, N. Y.—Ontario Tire & Rubber Co., capital stock, \$50,000; to manufacture and deal in tires; incorporators, H. V. Cock, F. L. Robinson, F. B. Rowley.

Canton, O.—Automobile Products Co., capital stock, \$150,000; to manufacture parts; incorporators, D. Thomas, F. J. Moul, S. Ake.

Chicago—Chicago Motor Speedway Association, capital stock, \$750,000; to conduct race course business; incorporators, A. J. Sherman, L. A. Brownhill, M. E. Dorsey.

Chicago—Osgood Autolite Deflector Co., capital stock, \$50,000; to manufacture and deal in deflectors; incorporators, S. W. Osgood, W. C. Kenner, J. J. Sheridan.

Chicago—Standard Motor Car Co., capital stock, \$10,000; to manufacture and deal in motors; incorporators, E. Kullberg, D. Gordon, B. Christiansen.

Recent Incorporations

Chicago—Crescent Motor Delivery Co., capital stock, \$15,000; delivery business; incorporators, F. Towner, M. J. Carew.

Cincinnati, O.—Purified Petroleum Products Co., capital stock, \$300,000; to manufacture gasoline.

Cincinnati, O.—Automobile Equipment Co., capital stock, \$100,000; to manufacture and deal in motor cars; incorporators, G. W. Platt, A. Merkel, E. H. Maffey, M. L. Freeman, A. DeCharmes.

Cleveland, O.—Noble Air Pump Co., capital stock, \$25,000; to manufacture and deal in pumps; incorporators, E. E. Derr, G. B. Langman, T. S. Dunlap, J. C. Noble, C. H. Truscott.

Columbus, O.—Spring Street Garage Co., capital stock, \$5,000; incorporators, J. M. Hamilton, E. M. Hamilton, L. R. Wottering.

Columbus, O.—Columbus Automobile Trades Association Co., capital stock, \$1,000; to hold exhibitions; incorporators, F. E. Avery, J. P. Gordon, A. B. Voates, W. J. Miller, L. M. Browne.

Columbus, O.—Spring Street Garage Co., capital stock, \$5,000; incorporators, J. M. Hamilton, E. M. Hamilton, L. R. Wottering.

Columbus, S. C.—Lake City Motor Co., capital stock, \$3,000; incorporators, L. E. Nesmith, J. W. Lewis.

Corinth, N. Y.—Auto Fender Safety Lamp Co., capital stock, \$10,000; to manufacture and deal in lamps; incorporators, T. N. Derby, W. J. Pitkin, J. J. Pitkin.

Dover, Del.—New York Automobile Devices Co., capital stock, \$250,000; to deal in supplies; incorporators, W. Boyd, W. I. Lofland, W. F. Lofland.

Dover, Del.—Lincoln Motor Car Co., capital stock, \$1,750,000; to manufacture and deal in motor cars; incorporators, H. E. Latter, W. J. Maloney, O. J. Richard.

Dover, Del.—Azo Motor Co., capital stock, \$750,000; to deal in motor vehicles; incorporators, E. L. Latta, W. J. Maloney, H. E. Latter.

Emporia, Va.—Greensville Motor Co., capital stock, \$10,000; incorporators, W. T. Pond, M. S. Price.

Farmington, Me.—Tucker Auto Co., capital stock, \$10,000; incorporators, A. Tucker, A. B. Tucker.

Ft. Wayne, Ind.—Randall Auto Sales Corp., capital stock, \$20,000; directors, A. L. Randall, G. E. Randall, M. K. Randall.

Green Island, N. Y.—Van Curve-Light Co., capital stock, \$10,000; to manufacture motor cars; incorporators, W. H. Babbett, T. E. Vanderwerken, R. Caldwell.

Hamilton, O.—Weston Water Motor Co., capital stock, \$15,000; to make motors; incorporators, J. S. Spoerl, N. Williams, G. C. Morey, I. C. Baker, S. Shaffer.

Hamilton, Ont.—Fox Chain Co., capital stock, \$200,000; incorporators, J. W. Nesbitt, J. G. Gauld, T. Crosthwaite.

Hamilton, Ont.—Willis Overland Co., capital stock, \$500,000; to deal in motor cars; directors, F. Watts, J. A. Donovan, N. P. Von DerVoort, L. Sleeth, O. H. King.

Indianapolis, Ind.—Kuhns Auto Service Co., capital stock, \$5,000; to conduct motor car business; directors, F. W. Kuhns, B. C. Downey, E. L. Kuhns.

LaPorte, Ind.—Walter Starter Co., capital stock, \$30,000; to manufacture starters; incorporators, F. H. Walker, W. F. Loofbourrow, D. L. Loofbourrow, E. L. Walker, D. Walker.

Little Rock, Ark.—O. D. Tucker & Co., capital stock, \$6,000; to deal in tires and accessories.

Menominee, Mich.—Doughas Motor Car Co., capital stock, \$10,000.

Minneapolis, Minn.—Yale Motor Car Co., capital stock, \$20,000; to conduct garage and repair shop; incorporators, N. F. Olson, R. L. Olson, Hawkins Olson, G. A. Nelson.

Minneapolis, Minn.—Clark Auto Co., capital stock, \$25,000; to conduct motor car business; incorporators, F. C. Clark, C. Bofferd, J. A. Cronholm.

station. It is said to have cost the city only one-half the money required for a new engine of the same type.

Peugeot Agency Correction—In the February 12 issue of Motor Age, page 42, it was stated the Peugeot was handled by the Tennant Motor, Ltd., Chicago. This should have been Peugeot Auto Sales Co., Chicago.

O'Neill Capital Stock Increased—The O'Neill Oil and Paint Co. of Milwaukee, Wis., which last week increased its capital stock from \$250,000 to \$300,000, will use part of the new issue for the establishing of branch houses and gasoline and oil storage tanks at Hartland, West Bend, Whitewater and Waukesha, Wis. Eventually it is intended to cover the state of Wisconsin with branch distributing stations. The company will also establish six new paint mills, making a total of thirty.

Goodyear Making Tire Protector—The Goodyear Tire and Rubber Co. has formally taken over the manufacture and sale of Standard tire protectors, as a part of the work of its tire department. This action is taken as an indication that Goodyear experts believe that there is a legitimate and useful field for this type of outside protector. The Standard protector is a tire tread, fashioned separately. It not only comes down well over the side walls of the tire to be protected, but is so constructed that when once applied it remains firmly in place without any other fastening than the inflation pressure of the tire it covers.

Saxon Company Starts Shipments—A new record in motor car manufacturing is claimed by the Saxon Motor Co. The Saxon factory at Detroit has anticipated by a full week the announced date for first shipments and is now busily shipping cars every day. When the plans of the Saxon company were first made public last December, it was announced that shipments would commence March 1. The original production schedule called for the commencement of work in the factory February 15. The first chassis went through on February 16. The first demonstrating car was shipped February 21, a week ahead of the promised date. Since then shipments of demonstrators have been

made daily. According to H. W. Ford, president of the Saxon company, quantity production is assured from now on.

Speedwell Directors Elected—Directors of the Speedwell Automobile Co. of Dayton, O., were elected at the annual meeting of stockholders recently and the board will meet next month to elect officers. Henry Mead was chosen to succeed J. E. Schneider, who has gone to the National Cash Register Co. Other directors are J. E. Sauer, F. A. Funkhouser, E. F. Kimmel, R. A. Herbuck, P. D. Schenck, Walter Workman and W. L. Caten. Mr. Schenck is president of the company.

Hans Company to Move Soon—The Hans Motor Equipment Co., LaCrosse, Wis., one of the largest manufacturers of pumps and gauges for the motor car manufacturing trade in the world, intends to take occupancy of its new works about March 15 and will then more than double its capacity. Its present quarters, the old plant of the defunct Vote-Berger Co., electrical equipment, has been placed on the market by the trustee. The Hans company has large contracts with such firms as the Lozier, Cadillac and a score of others, and figures that there are running today 250,000 cars carrying its equipment.

Ford Opens Portland Plant—The new assembling plant of the Ford Motor Co., located at East Eleventh and Division streets, Portland, Ore., was opened during the past week and Manager F. B. Norman has moved his entire force into the new quarters. This new plant represents an investment of more than \$200,000 to Portland and will employ about 150 men when the plant is put in full operation March 10. The building occupies three floors and basement and contains 90,000 square feet of floor space. The floors are of heavy concrete construction designed to carry great weight, while the outside is finished in pressed brick and makes a very striking appearance. There are four of these Ford plants on the Pacific coast—one at Los Angeles, one at San Francisco, one at Seattle and one at Portland. They were built to assemble cars in units of 700, but the future outlook for the Oregon territory

looks up so good that the Portland plant will house just double that number of parts, or 1,400.

Brockton Company Changes Name—The recently formed Sterling Mfg. Co. of Brockton, Mass., that is designing a new car, on learning that another company had the same name it has, changed its firm name to the Sterling Motor Co.

White Ships 38 Motor Trucks—A train 700 feet long, made up of nineteen box cars, left the White Co.'s plant at Cleveland recently bound for Pittsburgh with a consignment of thirty-eight motor trucks. This is said to be the largest single shipment of trucks ever made.

Campbell Miller Advertising Manager—W. S. Campbell has been appointed advertising manager of the Miller Rubber Co. of Akron, O. Mr. Campbell has had several years' experience in the advertising world and formerly was circulation manager of The Iron Trade Review and Daily Iron Trade.

Truck Company Makes Statement—The officials of the Kelly-Springfield Motor Truck Co. wish to correct an erroneous impression regarding the finances of that company gained by the recent publication of an item to the effect that the capital stock of the Kelly Motor Truck Co. had been reduced to \$5,000. The last named concern, according to the Kelly-Springfield officials, is not in business and is simply holding its organization until outstanding claims are settled. The Kelly company and Kelly-Springfield company are not connected in any way.

Avery Marketing Spring Lubricator—Percy C. Avery, owner of the Avery Portable Lighting Co., Milwaukee, and inventor of gas and electric lighting for motor cars, has placed on the market a new specialty in the form of a simple lubricator for springs. The Avery rideover spring lubricators consist of strips of thin fabric treated with a graphite compound, which are inserted between the leaves of the spring by separating them slightly with a spring spreader, making it unnecessary to take the spring assembly apart. The strips come in the uniform size of 1¼-inch in width and about 7½ inches in length.

Recent Incorporations—Continued

Minneapolis, Minn.—Tire Supply Association, capital stock, \$50,000; to sell and make tires; incorporators, M. J. Rosenstein, L. S. Rosenstein, A. W. Juster, L. Rosenthal.

Minneapolis, Minn.—Altschwager-Rogers Co., capital stock, \$50,000; to manufacture bodies.

Montreal, Can.—Canadian Baby Car Co., capital stock, \$3,000,000; incorporators, N. Nantel, J. A. Myette, H. deLanauze, G. Serouille de Ber, G. Thoulin.

Montreal, Can.—Chapleau Wagon & Auto, Ltd., capital stock, \$100,000; incorporators, F. H. Chapleau, J. A. Dufresne, E. St. Marie, R. Langevin.

Montreal, Can.—Motor Finance Co., Ltd., capital stock, \$50,000; incorporators, A. Kornbloom, B. N. Todd, E. A. Mumford, A. G. B. Claxton, T. R. Ker.

Montreal, Can.—Emergency Service Ltd., capital stock, \$50,000; incorporators, C. A. Duclos, K. C. Penny, E. G. T. Penny, W. L. Bond, J. Bicknell, H. A. Chisholm.

Montreal, Que.—Westmount Motors, Ltd., capital stock, \$50,000; incorporators, F. H. Manley, G. Frimm, J. A. Davies, E. R. Decary, G. Gilbert.

Muncie, Ind.—Interstate Motor Co., capital stock, \$300,000; incorporators, E. C. Ball, E. B. Ball, J. M. Marling, B. W. Twyman, R. F. Rose, G. A. Ball, F. D. Rose.

Muncie, Ind.—Interstate Automobile Co., capital stock, \$300,000; to manufacture cars; incorporators, B. W. Twyman, F. C. Ball, E. B. Ball, G. A. Ball, J. M. Marling, T. F. Rose, F. D. Rose.

New York—Partridge, Clark & Kerrigan, capital stock, \$100,000; incorporators, E. S. Partridge, B. A. Wordemann, S. J. Wagstaff.

New York—Pierce-Arrow Renting Co., capital stock, \$500; renting business; incorporators, J. S. Williams, L. Morford, H. Abercrombie.

New York—Automobile Devices Co., capital stock, \$250,000; to manufacture and deal in motor cars and supplies.

New York—Cosmopolitan Automobile School Co., capital stock, \$5,000; incorporators, A. G. Armento, R. J. Morris, B. Wertheim.

New York—Mutual Auto Exchange, capital stock, \$1,000; incorporators, H. Rosenson, B. Feldman, S. Wolfson.

New York—David Acetylene Gas Generator Co., capital stock, \$10,000; incorporators, L. Strimban, D. Strimban, H. Melzer.

New York—Cota Piston Ring Corp., capital stock, \$10,000; to manufacture engine parts; incorporators, C. G. Campbell, W. R. Baird, S. S. Newton.

New York—Benz Automobile Sales Corp., capital stock, \$25,000; incorporators, P. R. Reiz, R. L. Engle, P. V. Glodio.

New York—J. A. Reitmunn Co., capital stock, \$5,000; to deal in motor car bodies; incorporators, J. D. Dunlop, J. A. Reitmunn, Q. M. Brooks.

New York—William Haussler, capital stock, \$1,000; to conduct repair shop; incorporators, D. Haussler, W. Haussler, E. Haussler.

New York—A. L. Robertson Motor Supply Co., capital stock, \$32,000; motor car business; incorporators, G. E. Smith, A. Keogh, W. W. Hoffman.

New York—Whitfield Starter Corp., capital stock, \$12,000; to manufacture starters; incorporators, T. M. Day, G. E. Foley, L. F. Mentz.

Oklahoma City, Okla.—Fremont Motor Co., capital stock, \$10,000; incorporators, R. B. Fremont, M. Fremont, T. J. Wilson, J. Fremont.

Penn. Yan, N. Y.—Penn Yan Cable Co., capital stock, \$50,000; to manufacture insulated cable; incorporators, E. R. Ramsey, G. S. Shephard, W. H. Neefus.

Philadelphia, Pa.—American Auto Tire Jobbers Co., capital stock, \$5,000.

Port Jervis, N. Y.—George W. Case Co., capital stock, \$5,000; motor car business; incorporators, G. W. Case, A. B. Case, I. M. Kadel.

Portland, Me.—American Electric Car Co., capital stock, \$1,500,000; directors, F. A. Brand, T. Huss, J. E. Manter.

Regina, Sask.—Bingham Pneumatic Wheel Co., capital stock, \$50,000.

Rochester, N. Y.—Curtis-Pembroke Co., capital stock, \$10,000; incorporators, H. A. Curtis, C. J. Pembroke, I. A. Pembroke.

Rocky Mount, N. C.—Rocky Mount Motor Car Co., capital stock, \$5,000; incorporators, W. R. Dawes, C. E. Pitt, F. L. Pitt.

Saginaw, Mich.—Hubbell Auto Sales Co., capital stock, \$10,000.

Spencer, O.—Spencer Auto & Machine Co., capital stock, \$6,000; directors, G. W. White, H. B. White, H. C. White and others.

Stamford, Conn.—Bell Automobile Sales & Renting Co., capital stock, \$2,000; incorporators, A. W. Bell, J. B. McGuinness, J. E. H. McMahon.

St. Louis, Mo.—Bittel-Leftwich Tire Service Co., capital stock, \$25,000; to maintain tire service station; incorporators, C. G. Bittel, G. Beaker, B. O. Leftwich.

St. Louis, Mo.—Automobile Combination Lock Co., capital stock, \$25,000; incorporators, W. Graffman, H. W. Hopkins, H. W. Geller, A. A. Beckman.

Toronto, Can.—Ontario Motor Co., capital stock, \$10,000; to conduct agency.

Tupper Lake, N. Y.—Dubois Engine Co., capital stock, \$10,000; incorporators, A. F. Dubois, F. J. Dubois, B. J. Fountain.

Uniontown, Pa.—Shaw Motor Co., capital stock, \$10,000; incorporators, J. M. Shaffer, C. C. Shaw, R. M. Campbell.

Wallingford, Conn.—Wallingford Auto Co., capital stock, \$5,000; incorporators, F. W. Bottume, M. C. Bottume, E. C. French.

Wilmington, Del.—Broderick Inner Tube Protector Co., capital stock, \$500,000; to manufacture tubes; incorporators, W. C. Arnold, M. B. MacCauley, J. M. Satterfield.

Wilmington, Del.—Lincoln Motor Car Co., capital stock, \$1,750,000; to manufacture and sell motor cars; incorporators, H. E. Latter, W. J. Maloney, O. J. Reichard.

Wilmington, Del.—International Cyclecar Co., capital stock, \$500,000; incorporator, W. E. McCarthy.

Wilmington, Del.—Lincoln Motor Car Co., capital stock, \$1,750,000; incorporators, H. E. Latter, W. J. Maloney, O. J. Reichard.

Winnipeg, Can.—Security Rubber & Supply Co., capital stock, \$30,000; incorporators, R. H. Richardson, M. Wilson, P. C. Locke, F. R. Sproule.

Xenia, O.—Hawkins Cyclecar Co., capital stock, \$50,000; to manufacture cyclecars; incorporators, G. Little, H. Little, D. W. Cosley, P. Hawkins, J. W. Prugh, W. D. Wright, J. F. Orr and others.



Brief Business Announcements



ST. LOUIS, Mo.—Fred Campbell has been appointed St. Louis agent for New Departure ball bearings.

Columbus, O.—The Everitt Auto Sales Co., central Ohio distributor for the Maxwell, has moved into new quarters at 222-226 North Fourth street.

Waupaca, Wis.—Charles Johnson of Waupaca, Wis., has leased the Johnson building at Waupaca, and will open a garage and repair shop March 15.

Youngstown, O.—The Youngstown Motor Car Supply Co. is the name of a new concern, handling pleasure car and truck supplies and accessories, recently established here.

Lima, O.—J. C. Thompson, Jr., will soon start the erection of a \$10,000 garage on Market street to be used as an electric service station. The structure will be 170 by 50 feet.

Milwaukee, Wis.—Longstaff & Meredith has established a store and shop at 329 Fourth street, Milwaukee, Wis., for the sale of motor car lighting equipment and repair of lamps, radiators, etc.

Portland, Ore.—An important change in the personnel of the Pacific Motors Co., of Portland, took place last week when H. C. Skinner purchased an interest in the concern and assumed active management of the business.

Milwaukee, Wis.—The H. L. Hadden Co., 202 Mitchell building, Milwaukee, Wis., state distributor for Bethlehem spark plugs, has been appointed Wisconsin distributor for the Farr hydraulic system for storing and handling fuel and lubricant.

Columbus, O.—Another change in the management of the Franklin Cycle and Supply Co., 142 East Gay street, was made when W. A. Ashelman was named manager to succeed R. E. Merrill. The company is central Ohio agent for the Cole.

Cleveland, O.—J. C. Shiffer and M. A. Doucette have organized the Leading Auto Paint and Trim Shop and have located in their own plant at Superior avenue and East Fifty-fifth street. Mr. Shiffer is president and treasurer and Mr. Doucette general manager of the company.

Lexington, Ky.—The Phoenix Motor Co., of Lexington, Ky., has sold its garage fronting 80 feet in East Main street, to James B. Lyons and his sister, Mrs. Elizabeth L. McCoy. The Phoenix company will occupy the building under a long lease, having moved into the new structure in January, 1911.

Cleveland, O.—L. L. MacAnaney has been made manager of the Cleveland branch of the Republic Rubber Co. He was identified with the Goodrich company for 7 years as local branch manager and on the consolidation of the Goodrich and Diamond branches was made manager of the combined houses.

Milwaukee, Wis.—The Milwaukee Cycle Supply and Sales Co., 799 Seventh street, Milwaukee, Wis., which owns and operates the Milwaukee Auto Sales Co., distributor of the Maxwell line, has increased its capital stock from \$30,000 to \$75,000. The management recently was organized, L. Lippow retiring. H. C. Liessman and Watson E. Barnhart, both of Tomah, Wis., have taken a large financial interest. J. J. Koehler, manager of the motor car business, has been made general manager of both divisions, or

the concern's entire interests. Mr. Barnhart will handle the retail motor car business.

Bowling Green, O.—B. H. Avery has purchased a controlling interest in the Court Street Garage, and took possession March 1.

New York—James T. Levis has been appointed manager of the New York branch, situated at 127 West Thirty-seventh street, of the Radiator Fix Co., Boston, Mass.

Fremont, O.—Tom Williams has acquired an interest in the firm of Hilt & Keating, which will be styled the Hilt, Keating and Williams Co. The concern has the agency for the Ford, Allen, Hudson and King cars.

Seattle, Wash.—The Stanley Motor Car Co. has opened a salesroom at 311-13 East Pike street, Seattle, Wash. E. E. McMahan and W. D. McMahan, the members of the firm, have taken the agency for the Stanley steamer.

Philadelphia, Pa.—The American Auto Tire Jobbers have established headquarters at 156 North Broad street. The new concern deals in seconds. H. Pressman is president and general manager and G. G. Meeley secretary and treasurer.

Columbus, O.—W. E. Evans & Co., which have been operating an electric garage at 167 North Fourth street, will soon move into a larger and more modern garage at 220 East Gay street. M. Abel, agent for the Baker electric, also will be located in the same quarters.

Cleveland, O.—T. Barney Kennard, formerly manager of the Swinehart tire branch here, is now associated with the Miller distributing branch, the City Auto Tire and Supply Co., 1200 Huron road. Kennard will be the factory representative through the northeastern part of the state.

Milwaukee, Wis.—L. S. DeLand, for 2 years special factory representative of the Studebaker Corp. in Wisconsin, has been appointed general sales manager of the Woll-eager Sales Co. of Milwaukee, state agent for the Studebaker. Mr. DeLand will be in charge of both wholesale and retail sales.

Columbus, O.—Harry Gwinn has severed his connection with the Gwinn Sales Co., 172 North Fourth street, agent for the Lozier in central Ohio. The business now is being operated by W. P. Glenn and R. M. Cameron under the old name. The company covers a number of counties in central Ohio but will handle the territory from Columbus.

Louisville, Ky.—J. A. Dugan has been appointed vice-president and sales manager of the Standard Auto Co., local agent for Cole, Reo and Regal pleasure cars and the Woods electric. George Dunham, who has long been identified with the trade in this city, has severed all connection with the concern. Clifford L. Alderson will continue as general manager of the company.

Milwaukee, Wis.—The Milwaukee branch of the Buick Motor Co. has set a new record for sales, at least, so far as the northwestern territory is concerned, during the first 2 months of 1914. The Flint works shipped two solid trainloads to the Hokanson Automobile Co., Madison, Wis., distributor for the western Wisconsin territory, in January, and a solid trainload to the Tanberg Automobile Co. of Eau Claire, northwestern Wisconsin distributor, on February 2. Eau Claire is a city of 21,000 and Madison has 29,000 inhabitants, and the Buick factory says that these shipments are the largest

that have ever been made to cities of this size in the history of the motor car industry, so far as it is able to ascertain.

Philadelphia, Pa.—The Hardman Tire and Rubber Co., 1936 Sansom street, has established a branch at 1506 Pacific avenue, Atlantic City, N. J.

Boston, Mass.—The Marathon Tire Co. is now represented in New England with headquarters in Boston, Mass., the Dayton Tire Co. having added the Marathon to its line.

Boston, Mass.—Charles E. Collard has been appointed New England manager of the Vulcan-Bessemer Co. of Boston. He was formerly with the Goodyear company in New York.

Bowling Green, O.—The Sterling livery barns on North Main street are being remodeled into a garage to be conducted by J. J. Carson under the name of the Carson Garage.

Seattle, Wash.—A. M. Peterson is now in charge of the tire department for Chanclor & Lyon in Seattle and will have supervision of Lee tire distribution in Washington and Idaho.

Louisville, Ky.—The Motor Sales Co., local distributors of Metz and Paige cars, have moved into new salesrooms at 728 Fourth street, formerly used by the Oldsmobile Co. as its southern branch house.

Boston, Mass.—The E-Z Rim Co. of Boston Mass., has just opened a new service station at 98 Massachusetts avenue. B. A. Crockett, formerly identified with several agencies, is manager of the new company.

Boston, Mass.—The Chicago Pneumatic Tool Co., maker of the Little Giant truck, has opened salesrooms at 221 Columbus avenue, Boston, and Gentry Clark, formerly with the Garford agency in Boston, has been made manager.

San Francisco, Cal.—H. J. Galvin has been appointed manager of the San Francisco branch of the Remy Electric Co., upon the retirement of P. E. Kempton. Mr. Galvin has been connected with the Remy company for several years.

Racine, Wis.—The Foster-Lockwood Oil Co., Racine, Wis., organized recently to distribute fuel and lubricants, will build a large warehouse and several large steel storage tanks as soon as the Racine common council grants the necessary permission.

Cleveland, O.—G. J. Kellogg has announced the organization of a company by himself and W. S. Pettet to handle the Commerce truck here. Salesrooms and service station have been located in the Euclid Square garage building, East Thirteenth street.

St. Louis, Mo.—The Boyd Supply Co. has opened offices in the Rialto building to sell tires and other accessories. The firm, which is going to manufacture several specialties, will aim to sell largely to the more important manufacturing concerns. The firm is Frank D. Boyd, late of the Corliss supply department, and Francis Bryan, former motor car insurance writer.

Manitowoc, Wis.—The E. Stupecky Electrical Co. has been organized at Manitowoc, Wis., and established a store and shop at 1208 Washington street to build, sell and repair electrical devices, including magnetos, generators, self-starters, etc. The members of the firm are Edward Stupecky, until recently with the J. I. Case works at Racine; Leonard Zielsdorf, Erie, Pa., and Edward Warren of Manitowoc.

Recent Agencies Appointed by Motor Car Manufacturers

PLEASURE CARS

Town	Agent	Make	Town	Agent	Make
Albany, Minn.	John T. Brinkman	Maxwell	Kimball, Minn.	N. A. Brown	Maxwell
Audubon, Minn.	A. Swanson	Maxwell	Kingsley, Ia.	Tom Sheaffer	Hupmobile
Austin, Minn.	C. J. Christie	Maxwell	Little Falls, Minn.	Dr. J. H. Newman	Hupmobile
Alda, Neb.	W. B. Rolston	Maxwell	Los Angeles, Cal.	D. L. Whitford	Scripps-Booth
Albert Lea, Minn.	Jenson, Peterson & Hatteberg	Maxwell	Logan, O.	Gage Auto Co.	Hudson
Ashland, Ky.	H. D. Wollman	Ohio	Lancaster, O.	Star Motor Car Co.	Hudson
Amherst, O.	Henry Sipple	Ohio	Lancaster, O.	Erskin & Corkwell	Paterson
Albany, N. Y.	C. S. Ransom	Scripps-Booth	LaGrange, Ky.	C. M. McDowell	Overland
Anita, Ia.	E. E. Melien	Hupmobile	La Moure, N. D.	John Young	Maxwell
American Falls, Ida.	L. R. Gailher	Hupmobile	Luverne, Ala.	J. C. Allen	Maxwell
Akron, O.	B. D. Nichols	Ohio	Lufkin, Tex.	Sam H. Kerr	Maxwell
Atkinson, Neb.	C. E. Albright	Ohio	Monticello, Ga.	Dr. F. S. Belcher	Hupmobile
Birmingham, Ala.	W. H. Hitchcock	Hupmobile	McDermott, O.	F. M. Waller	Ohio
Browerville, Minn.	Alabama Motor Co.	Maxwell	Metropolitan, Ills.	J. W. Green	Ohio
Bucyrus, O.	Peter Hermes	Maxwell	McArthur, O.	Dr. A. W. Paffenbarger	Detroit
Brookings, S. D.	Kroegel & Pursel	Hudson	Mansfield, O.	Herring Buggy Co.	Hudson
Blue Earth, Minn.	P. N. Pedersen	Maxwell	Marysville, O.	Marysville Motor Car Co.	Hudson
Bedford, Ky.	Quiggle Brothers	Maxwell	Mt. Sterling, Ky.	H. Clay McKee & Sons	Hupmobile
Bloomfield, Ky.	Trimble Auto Co.	Overland	Madisonville, Ky.	W. J. Dulin	Overland
Brooklyn, N. Y.	J. W. Huston	Overland	Montgomery, Ala.	Cole Motor Co.	Maxwell
Buffalo, N. Y.	Geo. L. Bradt	Ohio	Marshall, Ill.	Charles Brandenstein	Maxwell
Bucyrus, O.	Geo. Fogarty	Ohio	Morgantown, W. Va.	Colonial Motor Car Co.	Maxwell
Buffalo, N. Y.	Huila-Beach	Ohio	Middlesborough, Ky.	H. E. Motch	Maxwell
Bridgeport, Ill.	Buffalo Cyclecar Co.	Scripps-Booth	Mohall, N. D.	Robinson Brothers & Co.	Maxwell
Binghamton, N. Y.	S. B. Postlethwaite	Hupmobile	Marshall, Minn.	R. M. Addison & Sons	Maxwell
Buffalo, Ky.	Herman C. Clark	Scripps-Booth	North Clymer, N. Y.	W. H. Newell	Hupmobile
Byron, Neb.	Orville Upton	Hupmobile	Newark, N. J.	Cyclecar Distributing Co.	Scripps-Booth
Bowling Green, Ky.	H. C. Reinke	Maxwell	New York, O.	E. J. Willis & Co.	Scripps-Booth
Battle Creek, Mich.	W. Y. McGinnis	Overland	Newark, O.	J. F. Priest	Ohio
Bloomville, O.	H. L. Phillips	Ohio	Nelsonville, O.	Frank Minner	Studebaker
Bellaire, O.	F. F. Kutz	Ohio	Nashville, Ill.	A. Davenport	Velle
Boonville, Mo.	Wm. Ludwig	Ohio	New Albany, Ind.	Borgerding Motor Car Co.	Overland
Camden, S. C.	William Vurtel	Velle	New Albany, Ind.	Borgerding Motor Car Co.	Hudson
Cameron, Tex.	W. R. Eve, Jr.	Hupmobile	O'Fallon, Mo.	Saffin Bros.	Oakland
Center Junction, Ia.	J. H. Gandy	Hupmobile	Owensboro, Ky.	Central Motors Co.	Overland
Columbus, O.	M. G. Alsever	Hupmobile	Opelousa, La.	Opelousa Mercantile Co.	Maxwell
Cleveland, O.	Buckeye Cyclecar Co.	Scripps-Booth	Plankinton, S. D.	Frank Bohe	Hupmobile
Council Bluffs, Ia.	Gabriel Cge & Wagon Co.	Ohio	Ponca, Neb.	A. H. Hilles	Hupmobile
Cleveland, O.	E. E. Gray	Ohio	Philadelphia, Pa.	Shoemaker, W. Walter	Scripps-Booth
Chicago, Ills.	A. B. Manley	Ohio	Philadelphia, Pa.	B. H. Kirkbride	Ohio
Chicago City, Minn.	Ohio Motor Co. of Illinois	Ohio	Pittsburgh, Pa.	Ohio Motor Sales Co.	Ohio
Cambridge, O.	Shoholm Brothers	Maxwell	Philadelphia, Pa.	Trumbull Motor Co.	Trumbull
Camden, O.	Arnold & Urban	Maxwell	Paris, O.	C. O. Tomlin	Paterson
Camden, O.	Crauder & Pugh	Maxwell	Poplar Bluff, Mo.	Reliable Motor Co.	Richmond
Conger, Minn.	Conger Auto Co.	Maxwell	Porter, Minn.	Miller & Berg	Maxwell
Cleveland, O.	John P. Keopke	Ohio	Pensacola, Fla.	J. D. Anderson	Maxwell
Corydon, Ind.	V. H. Bullett & Sons	Overland	Preston, Md.	J. L. Covey	Maxwell
Carlisle, Ky.	Main Street Garage	Hupmobile	Pine Bluff, Ark.	Mann Motor Car Co.	Maxwell
Clarence, Mo.	McCarthy Bros.	Hupmobile	Reno, Nev.	H. Andersch	Maxwell
Clyde, O.	R. C. Sanford	Ohio	Red Oak, Ia.	Hass & Milledge	Maxwell
Chagrin Falls, O.	Stoneman Howe Co.	Ohio	Russellville, Ky.	E. H. Cornelius	Overland
Columbus, O.	Craighead Motor Sales Co.	Ohio	Radnor, O.	Frank Confare	Paige
Dixon, Ky.	R. L. Jackson	Hudson	Radnor, O.	Frank Confare	Jeffery
De Mossville, Ky.	Hopkins & Hopkins	Maxwell	Richwood, O.	R. D. Roberts	Paige
Delaware, O.	Theodore Johnson & C. F. Rodenfels	Paige	Richwood, O.	R. D. Roberts	Jeffery
Delaware, O.	Theodore Johnson & C. F. Rodenfels	Jeffery	Rochester, N. Y.	F. Forschet	Ohio
Danbury, O.	J. Butler	Ohio	St. Louis, Mo.	Brinkman Motor Co.	Havers
Dublin, Tex.	N. J. Keith	Hupmobile	St. Louis, Mo.	Standard Elect. Sales Co.	Standard
Defiance, O.	Clint Colwell	Hupmobile	St. Louis, Mo.	Motors Clearing House	Coe
Danbury, O.	Walter Lammers	Ohio	St. Louis, Mo.	Auto Clearing House	Haynes
Detroit, Mich.	Norman A. Pabst	Scripps-Booth	Sheridan, Wyo.	Derfenderfer & Dinwiddie Auto Co.	Maxwell
Emmence, Ky.	D. L. Ricketts	Hupmobile	Schuyler, Neb.	Schuyler Motor Co.	Maxwell
Esmond, S. D.	C. A. Wickle	Maxwell	Sherman, Tex.	Wm. A. Bailey	Maxwell
Frankfort, Ky.	Armstrong & Grey	Hupmobile	Sikeston, Mo.	Lancaster, Keller & Co.	Hupmobile
Frederic, Wis.	Cyril C. Sandberg	Maxwell	Santa Rosa, N. M.	A. J. Nusome	Hupmobile
Frontenac, Minn.	Milwaukee Elevator Co.	Maxwell	St. Louis, Mo.	A. K. Haines	Scripps-Booth
Falls City, Neb.	Kentopp Brothers Auto Co.	Maxwell	Seattle, Wash.	S. V. B. Miller	Scripps-Booth
Farragut, Ia.	Farragut Auto Co.	Maxwell	Spokane, Wash.	Mitchell, Sherman & Kerr	Scripps-Booth
Florence, S. C.	C. Ray Smith	Hupmobile	Schenectady, N. Y.	Wm. D. Havens	Ohio
Fresno, Cal.	Waterman Brothers	Scripps-Booth	Sherrard, W. Va.	D. M. Garvin	Ohio
Ft. Wayne, Ind.	Auto Supply Co.	Ohio	Sherbrooke, Que.	J. W. McKee	Ohio
Fulton, O.	A. L. Pipes	Ohio	Shelby, O.	A. W. Stevens	Ohio
Franklin, Pa.	Grove City Garage	Ohio	Schulenberg, Tex.	C. A. Vogt	Ohio
Franklin, Pa.	J. A. & Chas. Pyle	Ohio	Seattle, Wash.	Stanley Motor Co.	Stanley
French Camps, Miss.	J. W. Howell	Hupmobile	Seattle, Wash.	Pope-Hartford Motor Car Co.	Chevrolet
Flat River, Mo.	J. H. Palmer	Oakland	St. Elmo, Ill.	Decker-Kelly Garage	Hupmobile
Gallon, O.	E. P. Rayl	Buick	Shelbyville, Ky.	The Mammoth Garage	Overland
Geddes, S. D.	W. H. Fowler	Hupmobile	Stithon, Ky.	J. F. Aubrey	Overland
Glasgow, Ky.	Dr. Carl Richards	Hupmobile	Sherburn, Minn.	A. D. Packard & Son	Maxwell
Glasgow, Ky.	Dickson Bros.	Overland	Sylacauga, Ala.	Hagan Brothers	Maxwell
Hillsboro, Tex.	T. L. Newton	Hupmobile	Spokane, Wash.	W. B. Hill Cycle & Car Co.	Ohio
Harrisburg, Ia.	T. C. Dempewolf	Hupmobile	St. Henry, O.	Wm. Romer	Ohio
Hecla, S. D.	A. G. Street	Hupmobile	Toronto, Can.	United Motors, Ltd.	Grant
Hartley, Ia.	J. C. Bradstreet	Hupmobile	Toronto, Can.	Anderson, Ltd.	Reo
Hartford, Conn.	G. I. Whitehead	Ohio	Tiffin, O.	L. D. Creeger	Hupmobile
Huntington, W. Va.	Harry P. McColm	Ohio	Tiffin, O.	Wingart & Miller	Partin-Palmer
Hillsboro, O.	Scott Skeen	Ohio	Thomaston, Ga.	King & Wheelless	Maxwell
Hallsville, O.	J. M. Boecher	Paige	Toledo, O.	J. Franke	Ohio
Hallsville, O.	J. M. Boecher	Jeffery	Tampa, Fla.	A. J. Reynolds	Ohio
Huntsville, Ala.	O. M. Graham	Moon	Utica, N. Y.	L. Davies	Ohio
Hannibal, Mo.	Hannibal Auto Co.	Imp	Venus, Tex.	Robert S. Morris	Hupmobile
Hope, Minn.	Slezak Brothers	Hupmobile	Winchester, Ky.	Hagan & Walters	Hupmobile
Huntsville, Ala.	O. H. Graham	Moon	Webster, Minn.	Arneson Brothers	Maxwell
Hopkinsville, Ky.	James H. Skarry	Overland	Waynesboro, Miss.	R. W. Fagan & Co.	Maxwell
Henning, Minn.	Cordes Brothers	Maxwell	Washington, C. H.	Moore & Jamison	Paige
Harrisburg, Pa.	Ensminger Motor Co.	Ohio	Washington, C. H.	Moore & Jamison	Jeffery
Hampton, Neb.	Hampton Auto Co.	Maxwell	White Earth, Minn.	George McLean	Hupmobile
Hanford, Cal.	Hanford Garage	Maxwell	Wakefield, Neb.	C. A. Samuelson	Hupmobile
Irrington, Ky.	E. L. Bennett	Overland	Whiting, Ia.	A. B. Elliot	Hupmobile
Ischepeming, Mich.	P. J. Denn	Ohio	Wichita, Kans.	Fred J. Noel	Scripps-Booth
Jeffersonville, Ind.	Jeffersonville Motor Car Co.	Overland	Wheeling, W. Va.	L. M. Danner	Ohio
Jacksonville, Fla.	Shackleford & Young	Maxwell	Xenia, O.	McGinn	Krit

COMMERCIAL CARS

Town	Agent	Make	Town	Agent	Make
Boston, Mass.	Chicago Pneumatic Co.	Little Giant	Manchester, N. H.	Hanover St. Garage	Koehler
Buenos Ayres, S. A.	Jorge Newbery	Koehler	Newburn, N. C.	D. H. Gaskins	Koehler
Cincinnati, O.	Cochran & Co.	Koehler	New Freedom, Pa.	H. Curtis Krout	Koehler
Columbus, O.	Gaither Automobile Co.	Little Giant	San Francisco, Cal.	Charles N. Weaver Co.	Menominee
Havana, Cuba	M. J. Freeman	Koehler	Toledo, O.	Claude Sturtevant	Commerce
Kansas City, Mo.	James E. Pixlee	Buick			

The Motor Car Repair Shop

ASIDE from giving interesting data to the driver, a gradometer or grade-measuring instrument is valuable in ascertaining just how steep a hill the car will climb on the different speeds and in some measure may tell the driver whether the motor is in proper working order. For example, should the car easily pull a 5 per cent grade and a month later a similar slope attempted with the same throttle opening and the motor begins to labor, it is an indication that the motor is not doing its work as well as it did a month previous.

Numerous designs have been offered for gradometers and one is here given which utilizes an ordinary oil can. The instrument is of simple construction throughout and may be made by the average motorist.

The general arrangement is shown at the right in Fig. 2 in which it will be seen that the device is mounted on the dash under the hood, the pointer extending through a slot in the dash. The only part of the gradometer to be seen on the dash is the indicator, consisting of the end of the pointer and the scale which shows the per cent of grade.

The sketch is reduced to exactly two-thirds full size. The main portion is an old oil can without the nozzle, the threaded portion being drilled horizontally at A to receive a metal pin B upon which the pointer is hinged. The pointer is cut out of sheet brass with the arms at right angles and drilled at the vertex of the angle to receive the pin. The horizontal arm should be $1\frac{1}{8}$ inches long and tapered to a point. The vertical arm, which hangs in the can, may be of any convenient length and to the lower end is fastened a piece of sheet lead. This sheet lead serves two purposes, acting as

The Making of a Gradometer

a pendulum and a counterbalance for the pointer as well as offering a surface to the oil in the can and preventing the pointer from wobbling too much.

To determine how large a piece of sheet lead to use, put on what seems to be too much, put a pin through the pointer and trim off lead till a slight touch will throw it out of balance. Then bend the lead into a small compass so that it can be inserted into the can, when it can be straightened out with a screw-driver. This done, the pin is put through the holes in the can and pointer and the ends upset; a slot having been cut in the neck of the oil can for the pointer.

A slot $\frac{1}{4}$ inch wide and 2 inches long is cut through the dash and the scale put on the driver's side of the dash alongside the slot. The divisions of the scale are found by dividing a 2-inch space into 12 equal divisions, each of which represent 10 degrees, as shown at the extreme right of the illustration.

The device is fastened to the dash in such a position that the end of the pointer projects $\frac{1}{4}$ inch through the latter and is opposite the middle or zero point of the



FIG. 1—MEANING OF PERCENT GRADE

If a grade, its base and height from the starting point are represented as a triangle as above the ratio between the height of the grade from the bottom, and the length of the base, is the percent grade. Above it is shown as being a rise of 50 in 1000 or a rise of 1 in 20 or 5 per cent

scale when horizontal. The best way to fasten the oil can is by means of an iron strap and bracket as shown. All that re-

mains to be done is to fill the can with oil.

Another Method of Grade Measurement

The meaning of per cent grade should not be forgotten in using measuring instruments. If the top of a hill is 50 feet higher than the bottom of the hill and the base of the hill, as shown in Fig. 1 is 1,000 feet long, the grade is one of 5 per cent. This is obtained by dividing 50 by 1,000, the answer being 1-20 or 5 per cent.

The simplest method of measuring grades without a gradometer and one which gives results sufficiently accurate for ordinary needs, is as follows. Procure a straight stick exactly 10 feet in length, a yard stick, and a carpenter's level. At a point on a hill where the roadbed seems to have the same grade as the hill as a whole, place one end of the stick on the ground and hold the stick horizontal. Then measure the distance from the end of the stick vertically to the ground. Multiply this distance in feet by 10 and the answer is the per cent of grade. For instance, if the end of the stick is 1 foot 9 inches from the ground, or $1\frac{3}{4}$ feet roughly 1.8 feet, the grade is 18 per cent.

Fitting New Bearings

After disassembling his motor an owner found that the rod bearings had been worn considerably and proceeded to fit new brasses. The bearings were scraped only a little and were made to fit so tightly that after the motor was assembled the engine could not be cranked. He had to have the car towed while in gear in order to crank the engine. The proper procedure would have been either to scape the bearings so they fit snugly but not tightly or operate the motor by a belt for 6 to 10 hours in order to work-in the bearings. The latter is the shop method.

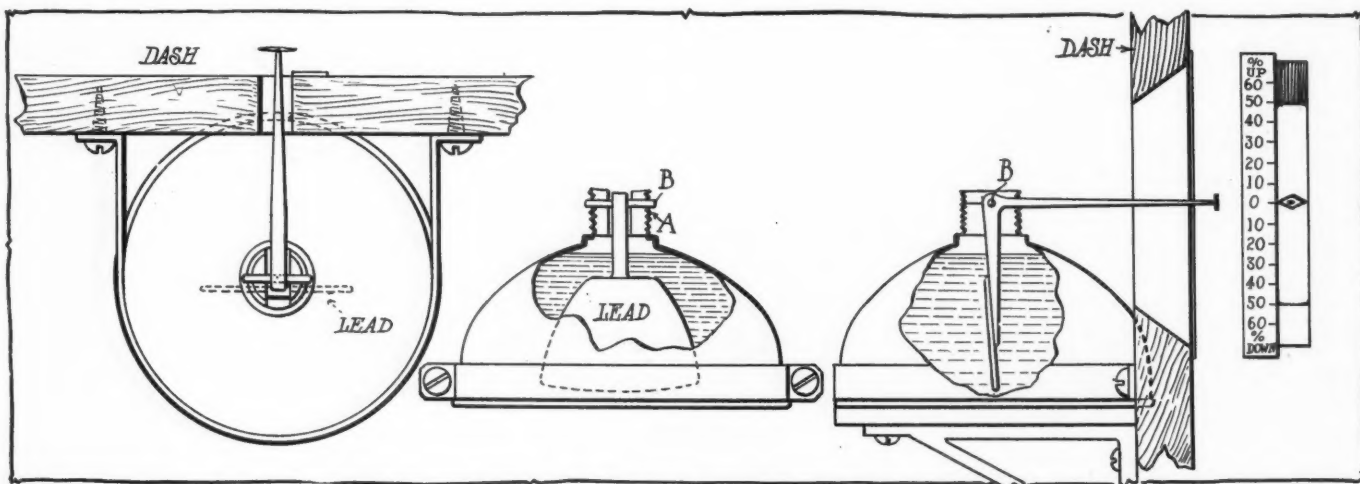
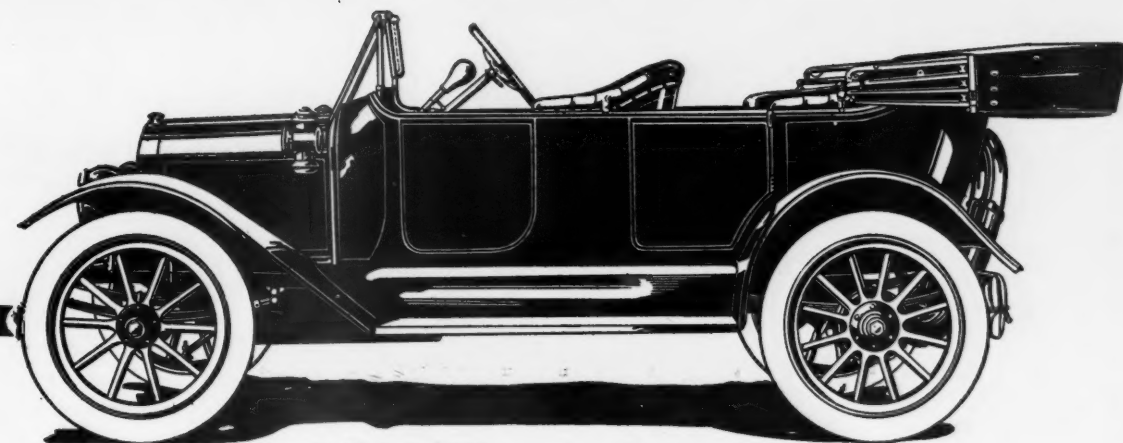


FIG. 2—HOW A GRADE MEASURING INSTRUMENT MAY BE MADE FROM AN OIL CAN

When the car ascends a grade the lead weight falls backward and is dampened by the oil in the can. By moving backward the pointer is made to run across the scale on the dash which is calibrated in per cent grade. The extreme left shows a top view, the next illustration a front view and the next a side view



Maxwell "25-4" 5 Passenger Touring Car

Stripped of All Adjectives and Advertising Verbiage This \$750 Maxwell Is

A CAR DESIGNED FOR THOSE discriminating buyers who yet must consider the pocketbook—or who, able to pay more, don't choose to—and who want a light family touring car of ample power to go anywhere; of reliability that guarantees a pleasurable return sans road troubles of any kind.

A CAR THAT WILL PERFORM; but also a car that looks the part; a car for the man who considers his automobile an everyday necessity and who counts the cost. A car that is economical in cost of upkeep—gasoline, oil and tire consumption.

YOU HAVE OFTEN SAID that you would be willing to pay a little more for a car that looked a lot better.

THIS IS THE CAR. It has been designed from your standpoint—for thousands of others have expressed the same desire you expressed.

KNOWING THE NEED—the demand—we have designed to meet it.

AND IT'S MADE JUST AS WELL as it's designed. Every ounce of metal that goes into it has been specified by our chief metallurgist, after the most exhaustive analyses and tests to determine the kind of metal—and alloy and heat treatment that would best meet the requirements and perform the functions of that particular part.

BETTER MATERIAL does not enter into the construction of any car on earth at any price; for here is the best the science of metallurgy and automobile construction knows.

THE MAXWELL MOTOR COMPANY offers this car without a mental reservation—and every dollar we have, and our reputation, stand back of it, to guarantee every owner satisfaction.

Maxwell Motor Company

(Incorporated)

Detroit, Michigan

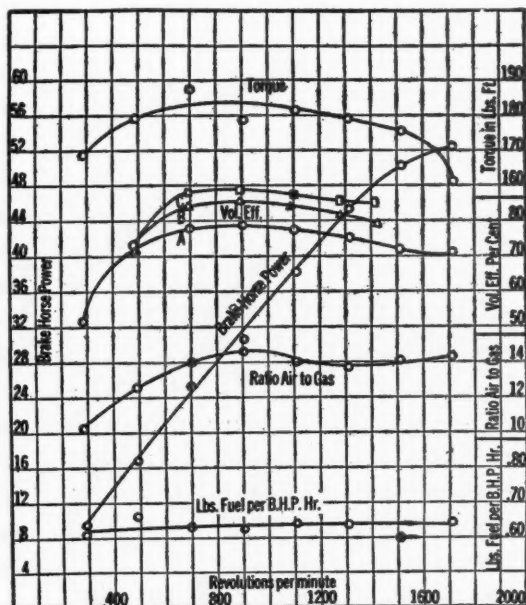
Dealers and Service
Everywhere

The Schebler Carburetor



officially breaks
all world's records
for power, econ-
omy, flexibility
and endurance.
Completing the
337-hour test of

Moline-Knight Motor



in laboratory of the Automobile
Club of America, without change
of adjustment.

The most perfect performance
of a carburetor officially recorded
in gas engine history.

The carburetor was a Model R
Schebler, standard stock equip-
ment of the Moline-Knight Motor.

WHEELER & SCHEBLER, Indianapolis, Ind.

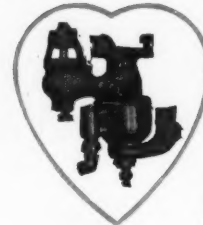
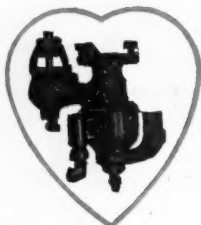
"Pioneers in Perfection of Carburetion"

BRANCHES:

Fry & McGill Motor Supply Co. Denver, Colo.
Automobile Accessories Co. Pittsburgh, Pa.
Ferris-Dunlap Auto Supply Co. Dallas, Tex.
Interstate Electric Co. New Orleans, La.
Reinhard Bros. Co. Minneapolis, Minn.
Manufacturers' Supplies Co. Philadelphia, Pa.
Weinstock-Nichols Co. Los Angeles, Cal.

Pennsylvania Rubber & Sup. Co. Cleveland
Wheeler & Schebler Chicago
Wheeler & Schebler Detroit
Fred Campbell St. Louis, Mo.
W. J. Connel Boston, Mass.
Equipment Co. Kansas City, Mo.
Elyea-Austell Co. Atlanta, Ga.
J. C. Nichols New York City
Weinstock-Nichols San Francisco

Fairbanks, Morse & Co., Ltd., London, England
Canadian Fairbanks-Morse Co. (All principal Canadian Cities)



When Writing to Advertisers, Please Mention Motor Age.

HAND KLAXON



\$10

When Writing to Advertisers, Please Mention Motor Age.



**The Trade Mark of a
New Standard in
MOTOR CLOTHS**

THE day of rubber interlined, surface coated, or artificial leather top materials is passing. These materials never have been suitable for automobile tops and have been used only as make-shifts pending the advent of a perfect automobile top cloth.

The **perfect top cloth** is now an accomplished fact.

Laidlaw Burbank Motor Cloth

which is a one-piece, single thickness cloth, absolutely waterproof and wear resisting beyond all others. It has for years been the standard open car top material in Europe and for nearly five years has been used almost exclusively by famous American body builders.

Laidlaw Burbank Motor Cloth is free from all the mechanical and chemical weaknesses characteristic of rubber interlined or surface coated top materials.

Top materials interlined or coated with rubber or artificial leather compositions peel, crack, blister, dry out and decompose. These weaknesses always have and always will exist in this type of top coverings.

Laidlaw Burbank Motor Cloth, being free from rubber or artificial leather compositions, is absolutely unaffected by climatic conditions nor is it injured by extreme heat or cold. Tops made of Laidlaw Burbank Motor Cloth are not cracked by raising or lowering as are tops of other kinds of material. This is most important in view of the general adoption of the One Man top, which will be raised and lowered much more frequently than the old-fashioned two man top.

Cadillac Motor Car Company used Laidlaw Burbank Motor Top Cloth on their entire 1914 production and have just reordered it for their entire 1915 output.

THE LAIDLAW CO., Inc., 126-132 West 46th Street
New York City

Ask for Circular "A Short Discourse on Automobile Top Cloth"

SAW THE

*Licensed Under Basic Patent for Treated Wood Separator*STORAGE BATTERY
IN HALF

And You Won't Be Surprised by Unpleasant Revelations

The attractive exterior of the **CLBA** is only excelled by its interior excellence.

Beauty is only skin deep. You may skin an **CLBA** battery—examine every detail of construction—piece by piece—and the closest scrutiny will fail to reveal any sign of careless workmanship or inferior materials.

The make-up of the active material—the know-how of construction are its only secrets.

Nothing is concealed or hidden and the pleasing exterior appearance of the **CLBA** is no more than a surface indication of its ample work throughout.

WILLARD STORAGE BATTERY CO.**Cleveland, Ohio**

New York Branch: 136 W. 52nd St.

Detroit Branch: 736, 738 and 740 Woodward Ave.

Indianapolis Branch: 438 and 439 Indiana Pythian Bldg.

Chicago Branch: 2241 Michigan Ave.

San Francisco Branch: 243 Monadnock Bldg.

SERVICE STATIONS IN ALL PRINCIPAL CITIES IN THE UNITED STATES, CANADA AND MEXICO

(88)

When Writing to Advertisers, Please Mention Motor Age.

**"On Behalf of My Associates and Myself I Want to
Thank the Many Dealers—Old Friends and
New—For Their Reception of our
Car and Our Company"**

—Benj. Briscoe

THE wonderful sales record of our car at the New York, Chicago and other shows, we believe, has never been surpassed in the history of the industry.

This surely indicates that the dealers have confidence in our product and in our company, and makes us happy indeed.

I want to thank the many dealers, old friends and new, on behalf of my associates and on my own account, for the splendid and spontaneous reception given to our car and to our company.

The very large demand for our car has caused us to make arrangements with our Manufacturing Department for an increased output, so that we will be able to execute contracts, based upon a larger production than we at first contemplated.

Inquiries from dealers in small cities and towns are especially welcome. We desire to deal direct with dealers wherever it is possible. We have one contract—the same for all.

I am very glad to be able to say that our manufacturing preparations are progressing most satisfactorily. We expect to begin

SHIPMENTS IN APRIL

We are "tooling up" in the best possible manner and our efforts are concerned only in such methods as will accomplish a uniformity in parts and the highest quality of workmanship. Chrome-Vanadium steel is used prac-

tically throughout the car and all other parts are likewise of the highest quality.

Our rule of conduct—"Quality First, Last and All the Time"—is the guiding principle with us.

One of the *best* and *most gratifying* things connected with our reception by the industry was the almost unanimous expression of good will on the part of the *older* automobile companies. Many of them are now regularly referring their dealers who are seeking a smaller car to ours as being the high grade medium sized car, and so a *fit* running mate for their higher priced, high grade productions.

WE ARE SATISFIED WITH SMALL PROFIT

We heard at the shows the remark made many times—"You cannot do it at the price." We acknowledge that we are giving wonderful value, but we are satisfied with small profit. There are only five of us in this company, all active automobile men, and we are not desirous of getting rich too rapidly.

Our risks are negligible, because the car has been thoroughly developed and tested out, and we believe that this year's production of from five to seven thousand cars will surely mean a demand for from ten to fifteen thousand next.

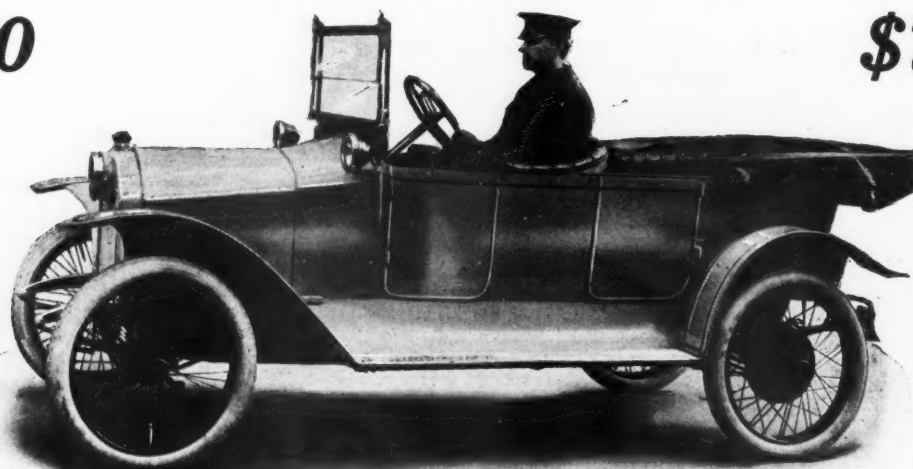
The Briscoe car is *honestly* made and *thoroughly* good. Its appearance speaks for itself. Its action will be conclusive evidence of its goodness. Our customers will be our best salesmen.

Benj. Briscoe
President

THE BRISCOE CAR

\$750

\$750



The New \$750 Briscoe Car Designed by American Engineers; and "tailored" by Parisian Artisans of Style Creation. Equipment: Electric lamps, horn, accumulator, demountable rims and tool equipment—\$750. With above and electric lighting generator and electric self-starter, top and boot, windshield, speedometer—\$900.

BRISCOE MOTOR COMPANY
General Offices, Broadway and 59th Street, New York
Factories at Jackson, Michigan

Stewart Speedometer

MAGNETIC PRINCIPLE

Big Canadian Distributor Forsakes Centrifugal for Magnetic Speedometer

John Millen & Son, Ltd., one of Canada's largest distributors, with an extensive chain of stores throughout the Dominion, has entirely abandoned the centrifugal type speedometer and is handling the Magnetic Type Speedometer alone.

This shows the trend of the times—a trend that has become an avalanche. It speaks in no uncertain terms of the final and complete supremacy of the Magnetic Type Speedometer.

It squares up with the fact that over 95% of the automobile manufacturers are now equipping their total output with speedometers of the magnetic type—

That more than 95% of the automobile dealers are handling only the cars equipped with speedometers of the magnetic type—

That more than one million speedometers of the magnetic type are in use every day.

And all because the car buying public knows what is best—and insists on getting it.

Insist on having a Stewart (magnetic) Speedometer on the car you buy, and you will get it.

Stewart-Warner Speedometer Corporation

Factories: Chicago, Ill., and Beloit, Wisc.

DIRECT FACTORY BRANCHES

Atlanta, Ga.
Boston, Mass.
Buffalo, N. Y.

Chicago, Ill.
Cleveland, Ohio
Detroit, Mich.
London

Indianapolis, Ind.
Kansas City, Mo.
Los Angeles, Cal.

Minneapolis, Minn.
New York, N. Y.
Philadelphia, Pa.
Paris

Pittsburgh, Pa.
San Francisco, Cal.
St. Louis, Mo.

And Service Stations in all large cities and towns

**• The most popular •
Speedometer in the World**

When Writing to Advertisers, Please Mention Motor Age.

INVADER OIL

TRADE MARK



An automobile oil can be neither better nor worse than its chemical tests show it to be.

In the face of such a self-evident truth it is difficult to understand how an oil with inferior tests can have any sale whatsoever.

THE BECKLEY-RALSTON COMPANY of Chicago, Ill., who are the largest jobbers and distributors of Automobile Accessories in the world, have taken the agency for Invader Oils in the middle west. A full stock of Invader Oils (including I-O-C Gear Oil) is carried in their Chicago warehouses.

Invader Oils are better than other oils by precisely the same extent that their tests are better.

INVADER OIL



TRADE MARK

These tests are simple and may be made by anyone. They are explained in a pamphlet which we will send free upon request.

INVADER OIL COMPANY, (Inc.)

79 Broad St., New York

(Lessees of Charles F. Kellom & Co.)

THE BECKLEY RALSTON CO. Chicago, Ill.

(Middle Western Distributors and Branch Warehouses)

Philadelphia Branch: 113 Arch St., Philadelphia

New Orleans, La. Electric Appliance Company

Los Angeles, Calif. W. D. Newerf Rubber Co.

San Francisco, Calif. W. D. Newerf Rubber Co.

Omaha, Neb. Lininger Implement Co.

Detroit, Mich. Boyer Campbell Co.

Salina, Kansas. Lee Hardware Company

Minneapolis, Minn. Knoblauch Warehouse Co.

Portland, Maine. James Bailey Company

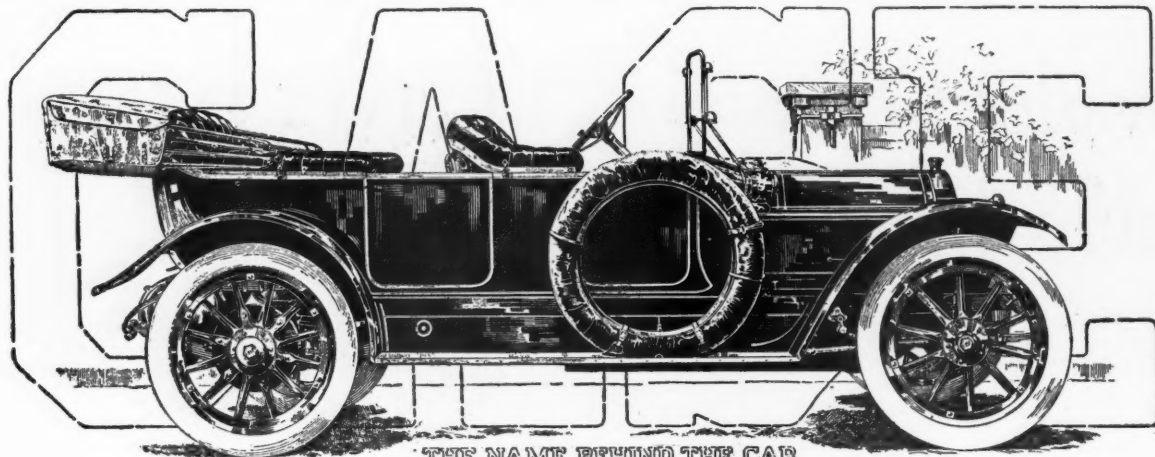
New York City. Wm. Jude, 1906 Broadway

Boston, Mass. George Collins, 284 Columbus Ave.

Honolulu. Hoffschlaeger Co., Ltd.

EXPORT SALES AGENTS:

CHIPMAN, Ltd. 8-10 Bridge St., New York



THE NAME BEHIND THE CAR

How to Judge a Motor Car

Just now, while most automobile makers are offering as much value as they can, it is well worth while to consider the facilities of each manufacturer. It takes Capital, it takes Experience, it takes Ability to build a worthy car. And in manufacturing, some ingenuity is required to decide where to save and where to spend. Careful buyers are asking, "Where does the money go?" "What does the maker do with it?"

Where We Save

The Case Company makes a notable saving *after the car is built.*

That is, in *selling* it—in getting it from factory to user.

For when the Case Company, five years ago, began motor making, it was unnecessary to create a Market or a Selling Organization.

Case business has been thriving nearly three-quarters of a century. Nine thousand Case dealers were waiting to receive Case Automobiles. Sixty-five established Case branches and 500 Case traveling men were ready to distribute the cars.

Imagine the saving. No market to create. No Selling Force to organize.

Has any other motor car maker such an economical arrangement?

Where We Spend

In proportion as the Case Company saves in the *selling*, it spends in the *making*. Thus come better materials.

Better workmanship.

Equipment that's *standard*. (See specifications.)

And more *complete* equipment than any other maker in existence.

Three-fourths of these unusual values are beneath hood and body. They are *invisible*. Even the most practiced engineer can not measure them, except through laboratory test. But those hidden values are vital. They are things one must have if he demands satisfactory performance.

As for style and refinement, please see this car and judge for yourself. Every buyer should suit his individual taste in this respect.

Built by Famous Makers

The Case organization has dealt with the American public for 72 years. It is a company backed by millions of dollars.

No concern ever valued its name and reputation more than Case.

The Case Company is as anxious to *give* value as you are to *get* it.

Don't you think—considering these facts—that you ought to see the new Case

models before you buy a car? An automobile costs too much money to be bought without fullest investigation.

Case Cars are made in three models—the Case "40," at \$2,300; the Case "35," at \$1,850, and Case "25," at \$1,250. Each is equipped in the Case *complete* way.

Your local Case Dealer will show the car. The new Case Catalog is ready. May we send it?

J. I. CASE T. M. COMPANY, Inc., ⁵⁰⁷ Liberty St. **Racine, Wis.**

Case Cars are sold through 79 Branch Houses and 9000 dealers in United States, Canada, South America, Philippine Islands and Europe



CASE

The Car With the Famous Engine

Case "40" Equipment

Westinghouse Electric Starting and Lighting Equipment

Bosch Magneto (2-Point, Dual System)

Warner Auto-Meter

8-Day Clock (Rim-Wind)

2-Tone Electric Vibrator Horn

Firestone Universal Quick-Detachable Demountable Rims

Goodyear No - Rim - Cut Tires (37x4½)

Extra Tire on Rim

Two Extra Inner Tubes

Tire Cover

Weed Tire Chains

Rayfield Carburetor, Water and Air Heated, Dash Adjustment

Genuine Pantasote Top and Dust Hood. Side Curtains, folded in top, easily adjusted from seat

Rain-Vision Ventilating Windshield

Electric Head Lights

Side Lights, Combination Oil and Electric

Electric Tail Light

Electric Dash Lamp

Work Light on Long Wire

Robe Rail, Foot Rest and the usual Tools, Tire Repair Kit, Jack, etc.

Mayo Impulse Tire Pump

Wheel Base, 124 inches

T-Head Motor (4½x5¼)

Forty Horsepower

Price \$2,300 (including all the above equipment)

RAYFIELD

WINS AGAIN

"Edwin Pullen in a Mercer wins the fifth international Grand Prix Race at Santa Monica, traveling seventy-seven and two-tenths miles per hour for four hundred and three miles."

Brief as it is, that sensational bulletin adds one more victory to the long list of Rayfield conquests.

Two successive victories in this strenuous race—Caleb Bragg in 1912 at Milwaukee and Edwin Pullen at Santa Monica.

Pullen used a Rayfield because he wanted Rayfield results; he expected to break all records for the Grand Prix; he raised the Grand Prix speed three miles per hour and outdistanced his nearest competitor by 40 miles at the finish.

For 35 laps Pullen broke the world's record for speed, traveling 79.2 miles per hour.

Need we emphasize this remarkable showing of the Rayfield Carburetor? Need we tell you who already know the merits of the Rayfield? It is sufficient to say, Look to the records of achievement in the past; base your judgment on the proofs of men who use Rayfield Carburetors because they want the advantages of Rayfield superiority.

Vanderbilt and Grand Prix

Read this List of Rayfield Victories:

Edwin Pullen	1914.....	Grand Prix at Santa Monica
Caleb Bragg.....	1912.....	Grand Prix at Milwaukee
Ralph De Palma.....	1912.....	Vanderbilt at Milwaukee
Ralph Mulford	1911.....	Vanderbilt at Savannah

The Rayfield is the only American carburetor that ever won the Grand Prix

FINDEISEN & KROPF MFG. CO.

2109 Rockwell Street, Chicago, Ill.

BRANCHES — 1140 Michigan Ave., Chicago; 1211 Woodward Ave., Detroit; 1902 Broadway, New York

"Sixes" vs. "Fours"

DURING the past few weeks big newspaper space has been used for the purpose of defending the high-priced four-cylinder car. We are not surprised. Any four-cylinder car selling for more than \$1800 certainly needs defense.

Whenever a tight shoe pinches, the wearer makes a wry face. And high-priced, four-cylinder shoes are pinching a number of feet pretty hard this season.

Let us examine the real situation of "Six" vs. "Four."

Three years ago there were eleven builders of "Sixes" in the United States. Last year twenty-five companies produced "Sixes."

In 1914 thirty-seven of the forty-two leading manufacturers of motor cars build "Sixes."

Can such development be due to a fad or whim, as the builders of high-priced "Fours" say?

High Priced Car Builders Found "Sixes" Superior

Seven years ago the Pierce-Arrow Motor Car Company built "Fours" only—"Fours" that were above reproach. Six years ago they added "Sixes" because the "Six" was demanded by those who wanted the utmost in a motor car. For five years the Pierce-Arrow has been building "Sixes" only. Not because the Pierce-Arrow "Four" was not good, but because the "Six" was proved better.

For years the Packard Motor Company built only "Fours." Today Packard cars are built in "Sixes" exclusively. Not because the Packard "Four" was not good; for there were no better "Fours." But because Packard engineers and Packard owners found the "Six" mechanically superior to the "Four"—and the Packard Company had the courage to build the car which was proved best.

The Peerless Company abandoned "Fours" for "Sixes" exclusively, because those who paid Peerless prices demanded the superior smoothness, flexibility and silence of the "Six."

Seven years ago the Winton Company predicted the growth and popularity of the "Six." Since 1908 Winton cars have been built in "Sixes" only, because Winton found the "Six" superior to the "Four."

There is no question now about the Winton prediction being right. Because this year practically every prominent maker, except one, selling cars above \$1250 is building "Sixes."

Public Demand Forced the Development of the "Six"

The admitted mechanical superiority of the "Six" over the "four" and the demand for this superiority on the part of those who are willing to pay any price for the motor car luxury forced these builders of high priced cars into the six-cylinder field.

Practically all successful builders of "fours," such as Locomobile, Packard, Pierce-Arrow, Stevens-Duryea, Winton, Peerless, Buick, Hudson, Oldsmobile, Marmon, White, Studebaker and Oakland, have been forced into the six-cylinder field.

None of these companies changed their designs or spent thousands and thousands of dollars for new machinery and to market new types of cars just to satisfy a whim.

Is it possible that all these admittedly successful companies are wrong? Isn't it logical to suppose that the majority is right? Isn't it conclusive when practically all makers above \$1250 are devoting their brains, money and energy to "Sixes"?

Is it reasonable to suppose that the one company which dissents should be right against such overwhelming evidence? It has been our experience that, price being equal, people want the greater smoothness, silence, flexibility, lower upkeep, and superior mechanical luxury of the "Six."

They want it now and they always will want it.

Pretty nearly all present owners of "Sixes" have at some time been owners of "Fours." Ask them which is the better car—"Six" or "Four"?

Did you ever know of a driver of a "Six" to go back to a "Four" of equal price?

Drivers of "Sixes" will tell you that there is something inherent in a "Six" that makes it better than a "Four," just as there is something inherent in a thoroughbred that makes him better than a horse of common blood.

Don't Buy a Near "Six" When You Can Get a Real "Six"

The best known builder of high-priced "Fours" this year admits the superiority of the "Six" by using a mechanism which it is claimed will give to the "Four" some of the recognized superior qualities of the "Six."

How consistent of those with "Fours" to sell to decry "Sixes" in one breath and in the next tell you they have a device that makes a "Six" of their car—nearly!

The superiority of a "Six" over a "Four" exists in the motor—and can be obtained only through the motor. It can't be obtained through the transmission or the rear axle.

The last resort of the four-cylinder advocate is that the "Four" is more economical than the "Six."

Positively, it is not.

It costs less to own a Chalmers Master "Six" a year, or to drive it 20,000 miles, than to own a "Four" of equal size and power an equal length of time. We have had in the Chalmers factory every well known "Four" of \$1800 or over. We have run them side by side with the Chalmers "Sixes" and here is what we have learned:

Power and Performance Considered "Six" Is More Economical Than "Four"

Because of its steady, uninterrupted flow of power, the "Six" is easier on tires and easier on every moving part than a "Four." "But a 'Six' burns more gasoline," say four-cylinder builders.

Again we say, that is not true.

For any considerable distance the Chalmers Master "Six" can be run on as little gasoline as any "Four" of equal motor displacement and with equal car size. This is not merely an advertising claim. We have proved this by actual tests.

A leading builder of high priced "Fours" is now announcing through the newspapers that he "has no intention of building a 'Six.'" We believe this must be a welcome announcement to a great many intending buyers who had already finally made up their minds to buy a "Six" and had, perhaps, been wondering whether this particular manufacturer would build one.

Now they have only to pick out the best "Six." They need no longer hesitate, anticipating that this particular builder may produce a "Six." Such statements of policy do much to clarify the public understanding of the motor car situation.

Chalmers Policy Is to Build Best Cars Possible at Chalmers Prices

As in the past, the Chalmers policy shall always be to build the most efficient, most up-to-date quality cars to sell at medium prices. The design of Chalmers cars shall be changed whenever adherence to that policy shall make changes necessary.

It is in pursuance of this policy of advancement that, having proved the "Six" superior to the "Four," the production of Chalmers factory is now being concentrated on "Sixes."

We predict that within two years all cars selling above \$1500 will be "Sixes." Even those who now decry the "Six" will be building "Sixes" within two years or building a "Four" at a great reduction from their present prices.

Cars selling above \$1500 belong to the six-cylinder field as much as the cars selling below \$1000 belong to the four-cylinder field.

It is just as impossible to stop the trend toward six-cylinder cars as it would be to dam the Niagara Falls. One builder of "fours," in the \$2000 class, claims more sales for his car than all makes of "Sixes" combined. This is positively exaggeration. There are being sold today three times as many "Sixes" as "fours" at \$1500 or over. Crying against the "Six" won't stop it—it only increases the desire for an investigation and a comparison of the relative merits of "Fours" and "Sixes." That is all that we as dealers in "Sixes" ask.

When You Buy a "Six" You Get the Newest Style and Best Investment

To you who are contemplating the purchase of a car this question of "Six" or "Four" is vital. We believe that only in a "Six" can you get a car which will give you the greatest satisfaction combined with safe investment. Why sink money in a car already out of style and bound to become more so each day?

When you buy a "Six" you buy on a rising market. When you buy a "Four" you buy on a declining market.

Our proposition is simple. We say ride in "Fours" and ride in "Sixes."

Ask your friends who have "Sixes" if they would go back to "Fours." We are sure you will want a "Six" after making such a test. And having reached that conclusion we ask you to ride in all the different "Sixes."

Then take the Chalmers Road Test. After this we are sure your purchase will be a Chalmers Master "Six."

Don't buy any car until you have done yourself and us the justice of investigating the Chalmers Master "Six."

Chalmers Motor Company, Detroit

When Writing to Advertisers, Please Mention Motor Age.

Buy the Car When You Know the Springs —Not Before

YOU can judge the *beauty* of the car you buy at the first glance. You can tell something of its *power* when the demonstrator takes you over a hill. But you can't be sure of the *springs* unless you determine what springs they are and what their record is. Because a spring giving supreme comfort in a demonstration may, within three months, sag and settle until it bounces and jolts you at every slight depression in the road.

Avoid spring uncertainty and disappointment. *Specify Detroit Springs and be sure.* We protect you beyond that first demonstration, which can't tell you what the spring is worth. Every Detroit Spring is backed by a *guarantee* against settling or breakage for *two years* from date of manufacture. It is spring insurance for you.

**Identify Detroit Springs by
This Trade Mark**



**And by the Lubricating Cup
Near the End of Each Leaf**

When you're looking the car over, watch for that Detroit Spring trade mark.

It means safety. Detroit Springs are almost impossible to fracture.

Comfort is certain.

Your tires will wear longer because Detroit Springs automatically assume a large percentage of this work.

That pest of the motorist—squeaking—is unknown.

These things require an inspection of the springs. And if you don't find the trade mark or the lubricating cups on the leaves, demand that your car be equipped with Detroit Springs.

You can get them. True, they cost the manufacturer a little more. But he'll give them to you, *if you insist*. Detroit Springs on any car are a strong indication of quality construction throughout the car.

**How to Ride Comfortably and Safely
Write for Booklet**

It pays to know springs, to *know why you should insist on Detroit Springs*. The information can be yours for the asking. A booklet of remarkable interest will be mailed to you on request. It tells the story of spring making from your standpoint as a car owner. Explains how Detroit Springs insure your safety and lengthen the life of your car and tires. Write for it.

Detroit Steel Products Company
2260 East Grand Boulevard, Detroit, Michigan

Why Detroit Springs Don't Squeak

The silence of Detroit Springs is enough in itself to decide you in their favor. The Self-Lubricating Device—patents pending—is simple, but mightily effective. Near the end of each leaf is a small distributing reservoir that automatically feeds the lubricant as it is needed. Not only is there no squeaking, but the spring is assured of far longer life. That's one of the reasons—

Why Detroit Springs Are Guaranteed for Two Years

Other reasons are material reasons, constructional reasons, workmanship reasons, test reasons.

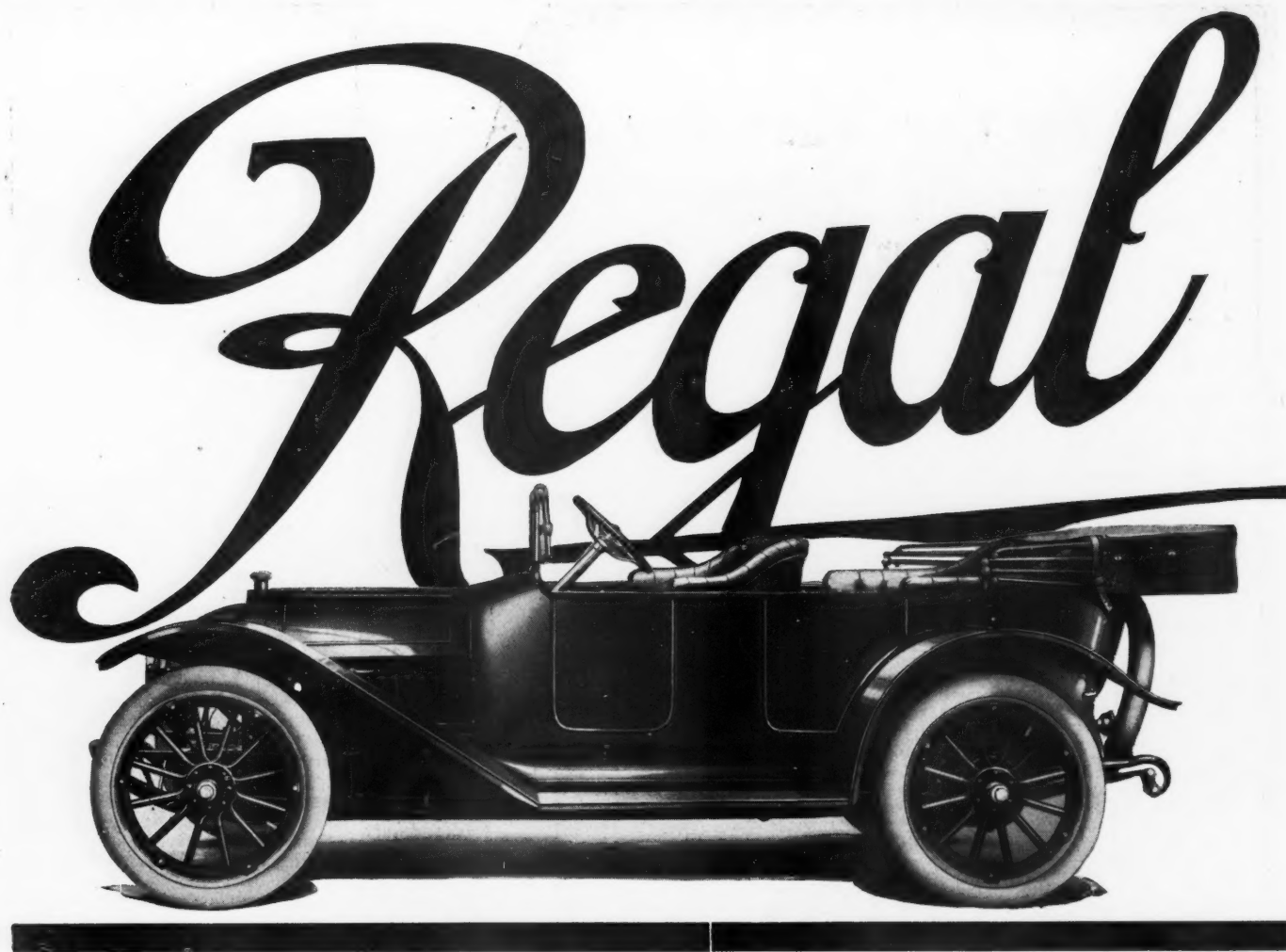
We decided to make the guarantee of two years' length, because we wanted to be conservative. Detroit Springs will give excellent service indefinitely. Our confidence is shown by the fact that we have doubled and in many cases trebled the best car guarantee. And our confidence is based on the most enduring of foundations.



Pyrometer

This man regulates the delicate Triple Heat Treatment of Detroit Springs. Forty-eight fires are maintained at just the right temperature by means of the Thermo-Electric Pyrometer. The dial seen above indicates the heat of any furnace by a color system. The actual temperatures are known only to three members of our organization and are among the most carefully guarded secrets of our process.

**Specify
Detroit Springs
on Your Next
Car**



Model T—The Famous Regal Underslung

*5-passenger touring car, electrically started and lighted. Completely equipped.
Price \$1125, f. o. b. Detroit.*

The Distinctive Car for the Discriminating Buyer

THOUSANDS of Regal owners the country over will tell you that the exclusive Regal construction makes Regal cars the last word in safety, stability, comfort and economy.

Compare the Regal in these respects with cars at a higher price, if you will. But—and here's the real test—compare the Regal with other cars at about the same price.

1914 bids fair to be far and away the biggest year in Regal history.

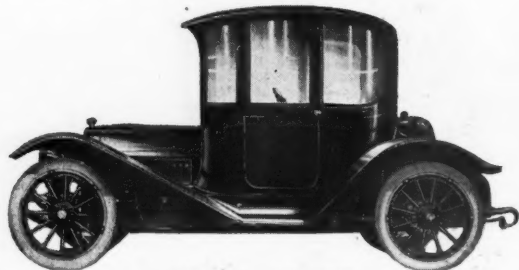
For the Regal is—and will be this year more than ever—the easiest bridge between the dealer who wants a satisfied trade and the buyer who wants a satisfying car.

On exhibition at the Boston Automobile Show.

REGAL MOTOR CAR COMPANY

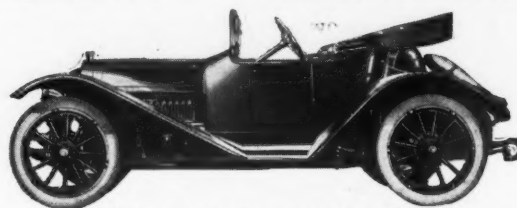
123 Piquette Ave.

DETROIT, MICHIGAN



REGAL COUPE

The perfect all-the-year-'round car. Impervious to the elements in winter; easily thrown open to the breezes when warm weather comes; every operating mechanism inside; completely equipped, including electric starting and lighting. Price \$1600, f. o. b. Detroit.



REGAL MODEL N ROADSTER

The ideal small-family or professional man's car. Completely equipped; electrically started and lighted. Price \$1125, f. o. b. Detroit.

When Writing to Advertisers, Please Mention Motor Age.

Genuine Duff-Built

BARRETT

AUTOMOBILE JACKS

The Barrett Adjustable Footlift—Patents Pending—the greatest jack improvement in years, and an exclusive feature of the Barrett 1914 Models. Is both *adjustable* and *interchangeable*. Can be fitted to Barrett Nos. 06, 07 or 08, converting them instantly into Nos. 066, 077, or 088. The Footlift is adjustable at any distance from top lift, to suit different front and rear axle heights.

No. 345
BARRETT
JUNIOR
1500 lbs. capacity
Patents
Pending



No. 345—Barrett Junior
—Patents Pending—Smallest Barrett with malleable iron base; for cars under 3,000 pounds. A moderate priced jack with every Barrett advantage.

No. 08—Barrett Standard
—One-ton capacity; height, closed, 11½ in.; raise, 6½ in. Base, socket lever and top of malleable iron; rack, pawls and pins special analysis high carbon steel, heat treated. Noscrews —parts cannot jar loose. Nos. 06 and 07 with 5½ in. and 4 in. raises respectively



Barrett 1914 Jack Specifications represent more strongly than ever the highest developments of jack safety, efficiency and convenience. Pawl points are machined all around, meshing perfectly. Pawl bearings also machined. Tire tool lever furnished with all new styles. Bearings, gears and racks of superior strength, high carbon steel. And every Barrett Jack is rigidly tested before leaving the factory.

The Duff Manufacturing Co.

Established 1883

PITTSBURGH, PA.

50 Church Street
New York

Peoples Gas Bldg.
Chicago, Ill.

Candler Bldg.
Atlanta, Ga.

Monadnock Bldg., San Francisco

The quality of the bearings in your car and the service they give, depends upon—the design—grade of materials used—factory facilities and workmanship.

In Hyatt Quiet Bearings correctness of design is proven by their universal adoption—they are made of the finest steels, scientifically treated—by expert workmen in the largest roller bearing factory in the world.

Two books, one about motor car bearings in general for prospective purchasers, the other for automobile owners, will be sent on request

"Hyatt Quiet Bearings"

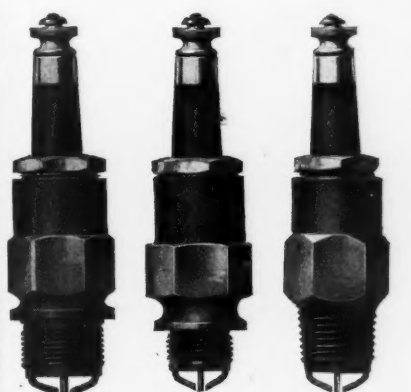


HYATT ROLLER BEARING Co.
DETROIT, CHICAGO
NEWARK, N.J.

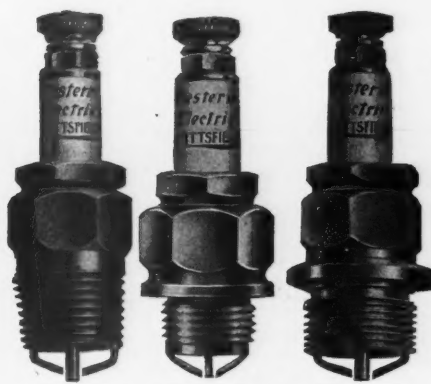
Western Electric

PITTSFIELD

SPARK PLUGS



1/2" thread. Combination
Metric Thread. Porcelain Mica
3/4" thread. Spark Plugs.



1/2" thread. Porcelain Spark Plugs.
Metric Thread.
3/4" thread.

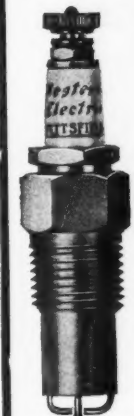


1/2" thread. Mica Spark Plugs.
Metric Thread.
3/4" thread.

For the Following Cars:



1/2" Thread
Maximum
Duty Plug



1/2" Thread
Extra Long
Spark Plug

Abbott-Detroit	3/4	Cutting	1/2	Lexington	3/4	Pullman K Battery	3/4
Adams-Farwell	1/2	Davis	1/2	Lion	1/2	Magneto	3/4 Long
Alco	1/2	De Dion	Metric	Little 4	3/4	Pullman "O" 30	3/4 Long
Alpena	3/4	Detroit	3/4	Locomobile	3/4	R. C. H.	3/4
American	3/4	Dispatch	3/4	Lozier	3/4	Rainier	3/4
Ames (1913-14)	3/4	Dorris	3/4	Marathon	3/4	Rambler	3/4
Ames (old)	3/4	Duryea	3/4	Marion	3/4	Regal	3/4
Amplex	Metric	E. M. F. "30"	3/4	Marmon	3/4	Renault	Metric
Angus	3/4	Elkhart	3/4	Marquette	3/4	Reo	3/4 Long
Apperson	3/4	Empire	3/4	Mason 1913-14	3/4	Republic	3/4
Atlas (1914)	3/4	Empire	3/4	Mason (old)	3/4	Rogers	3/4
Atlas (old)	3/4	Enger	3/4	Matheson	3/4	Royal Tourist	3/4 Long
Auburn	1/2 Long	Everett	3/4	Maxwell	3/4	Russel Model "R"	3/4
Auburn	3/4	F. I. A. T.	3/4	Mercer	3/4	Russel "22" "26" "38"	Metric
Austin	3/4	Firestone	3/4	Metz (old)	Metric	Russel Knight	Metric
Autocar	3/4	Flanders "20"	3/4	Metz "22" 1912-13	3/4	S. G. V. 1911	Metric
Babcock	3/4	Ford	3/4	Michigan Buggy	3/4	S. G. V. 1911-13	3/4
Babcock	1/2 Long	Franklin	3/4	Middleby	3/4	Salter	3/4
Badger	3/4	G. S. G.	3/4	Midland	3/4	Sauter	Metric
Bartholomew	3/4	Garford	3/4	Miller	3/4	Schacht 1 D.	3/4
Belmont	3/4	Gaylord	3/4	Mitchell-Lewis	3/4	Schacht 1911-12	3/4
Benz	Metric	Glide	3/4	Moline	3/4	Sebring	3/4
Bergdoll	3/4	Great Southern	3/4	Moon	3/4	Sebring	3/4
Berkshire	3/4	Great Western	3/4	Morse	Metric	Selden	3/4
Brush	3/4	Halladay	3/4	National	3/4	Simplex	Metric
Buckeye 1910	3/4	Halladay	3/4	Norwalk	3/4	Spaulding	3/4
Buckeye 1911	3/4	Haynes	3/4	Oakland	3/4	Speedwell	3/4
Buick 1907 "F"	3/4 Long	Havers	3/4	Ohio	3/4	Spoerer	3/4
Buick "10"	3/4 Long	Henderson	3/4	Oldsmobile (old)	3/4	St. Louis	3/4
Buick "16-40"	3/4 Long	Herschhoff	Metric	Oldsmobile 1912-13	3/4	Standard	3/4
Burg	3/4	Hudson	3/4	Only	3/4	Staver	3/4
Cadillac 1910-11	3/4	Hupp	3/4	Overholt	3/4	Stearns 1912-13-14	3/4
Cadillac 1912-14	3/4	I. H. C.	3/4	Overland	1/2 Long	Stearns (old)	Metric
Carter Car	3/4	Imperial	3/4	Packard	Metric	Stearns Knight	3/4
Case	3/4	Jackson 1913-14	3/4	Palge-Detroit	3/4	Stevens-Duryea	3/4
Chadwick	3/4	Jackson (old)	1/2 Long	Palmer Singer	3/4	Stoddard Dayton	3/4
Chalmers	Metric	Kearns	3/4	Panhard-Knight	Metric	Stoddard Knight	Metric
Cino	3/4 Long	Keeton	3/4	Pathfinder	3/4 Long	Streator	3/4
Clain	3/4	Kelsey	3/4	Patterson	3/4	Streator	3/4
Colby	3/4	Kenmore	3/4	Pearce	3/4 Long	Studebaker	3/4
Cole "30" 1910	3/4	King	3/4	Peelers	Metric	Stuts	3/4
Cole "30" 1911-13	3/4	Kissel Kar 1912-14	3/4	Pennsylvania	3/4	Triumph	3/4
Corbin "30"	3/4	Kissel Kar (old)	3/4	Petrol	3/4	Velle	3/4
Corbin "40"	3/4	Kline Kar	3/4	Pierce-Arrow 1910-11	Metric	Warren	3/4
Corbitt	3/4	Knox A. G.	Metric	Pierce-Arrow 1912-13	3/4	Wayne	3/4
Correja	3/4	Knox H.	3/4	Pierce Racine	3/4	Westcott	3/4
Crane	3/4	Knox 1908-9	3/4	Pittsburgh	3/4	White	Metric
Crawford	3/4	Knox R 1910-12	3/4	Pope Hartford	Metric	Winton K	3/4 Long
Crow	3/4	Knox 1913	3/4	Pratt-Elkhart	3/4	Winton G-1910-13	3/4
Croxton	3/4	K. R. I. T.	3/4	Premier	3/4	Winton 1914	3/4
Cunningham	3/4	Lambert	3/4	Pullman (old)	1/2 Long	Zimmerman	3/4



1/2" Thread
Duty Plug
Maximum



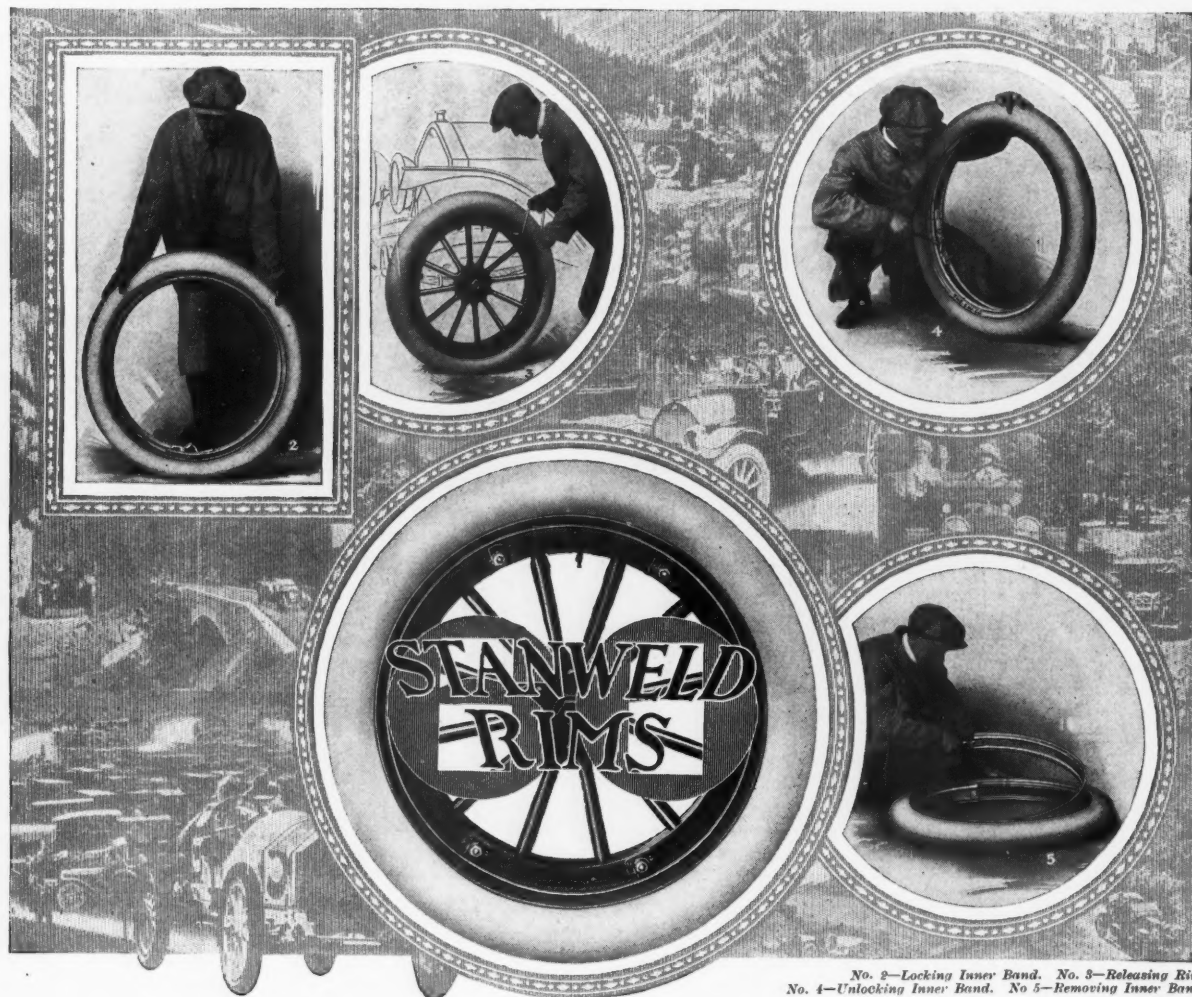
Metric Thread
Maximum
Duty Plug

Pittsfield Spark Coil Co., Mfrs.

WESTERN ELECTRIC COMPANY

New York and All Principal Cities

When Writing to Advertisers, Please Mention Motor Age.



No. 2—Locking Inner Band. No. 3—Releasing Rim.
No. 4—Unlocking Inner Band. No. 5—Removing Inner Band.

Making Tire-Repairs With Least Effort

THIS new demountable rim, Stanweld Number Sixty, offers an entirely new and better way of making tire-changes and repairs. It overcomes a difficulty hitherto thought to have been unconquerable.

All tires "freeze" to rims unless frequently removed. The action is natural and cannot be eliminated.

With the ordinary rim the "frozen" parts must be separated before you can remove or repair the tube.

But the construction of the Number Sixty gives complete relief from this necessary evil by permitting access to the tube without compelling you to rip, tear, or pull the tire from the metal flanges of the rim. And this feature is found only with Stanweld Number Sixty Rims.

If you've ever performed the temper-testing, strength-sacrificing, time-thieving job of making tire-repairs, you'll appreciate the Number Sixty.

Study the illustrations above. They'll give you some idea of the construction and operation of this remarkable new rim. If you want to know more about it send us a letter or postcard.

You can have the Number Sixty applied to your old car at a very low cost. You should get it on your new car without extra cost. Ask for it.

The Standard Welding Company

*Pioneers and World's Largest Producers of Rims
for Motor-Driven Vehicles*

Main Office and Factory CLEVELAND

NEW YORK CHICAGO DETROIT
U. S. Express Bldg. Peoples Gas Bldg. Ford Bldg.
Distributors in Principal Cities



The leading makes of pneumatic tires are guaranteed only when applied to rims bearing one of the accompanying inspection marks. You'll find these marks on Stanweld Rims



5th YEAR

MARCH 4
INAUGURATED
MARCH 4th 1909

Red Head
REG. U.S. PAT. OFF.
SPARK PLUG

*has kept pace with
the wonderful
growth of the
industry*



1910
172
JOBBER

1911
225
JOBBER

1912
286 JOBBER
73 MFR'S.

1913
419 JOBBER
143 MFR'S.

1914
553 JOBBER
325 MFR'S.

It has been our practice for the past four years to publish a list of jobbers, manufacturers and racing men, selling and using RED HEAD SPARK PLUGS.

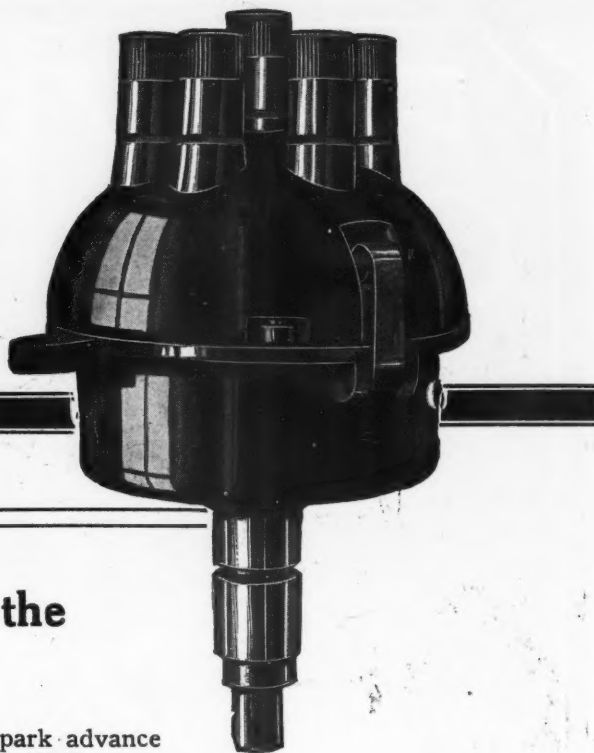
This year it is eliminated because such a list would occupy several pages and would be, practically, a reproduction of a directory of the industry.

A blue list of the jobbers featuring RED HEAD SPARK PLUGS has been printed for the convenience of the dealers and a copy will be mailed to interested parties.

EMIL GROSSMAN MFG. CO., Inc., Bush Terminal, Model Factory No. 20
BROOKLYN (New York City) U. S. A.

108 P

The Atwater Kent Ignition System



We Don't Intend to Abolish the Automatic Advance

We do, however, intend to make the automatic spark advance as much a feature of every high-grade car as the automatically controlled carburetor.

THE ATWATER KENT SYSTEM has in years past overcome supreme prejudice and magneto competition by the creation of a device which gave superior service with less attention and with longer life.

Now that automatic spark advance has actually become a thing to reckon with in motor car development, and has been placed upon thousands of the best cars, it is evident that the time has come when the motorist may cast one more of his old-time burdens aside.

There are some men, however, for whom we must apologize. They are mechanical fans. They like to tinker with any kind of mechanism, from a carpenter's plane to an automobile. There are a few of these who like to be constantly adjusting the spark advance on their car.

But the great mass of car owners want freedom from control attention and so we get the electric light, the self starter, the automatic carburetor, the electric gear shift, the automatic spark advance, etc., etc.

Automatic Spark Control Is the Ultimate Ignition

If you are buying a new car, be sure that you get the most modern and efficient ignition system, and if you are going to drive your old car this season very likely we can equip it with the ATWATER KENT SYSTEM at less price than the magneto. Hereafter you will have the kind of ignition service that has made the ATWATER KENT SYSTEM famous since 1905.

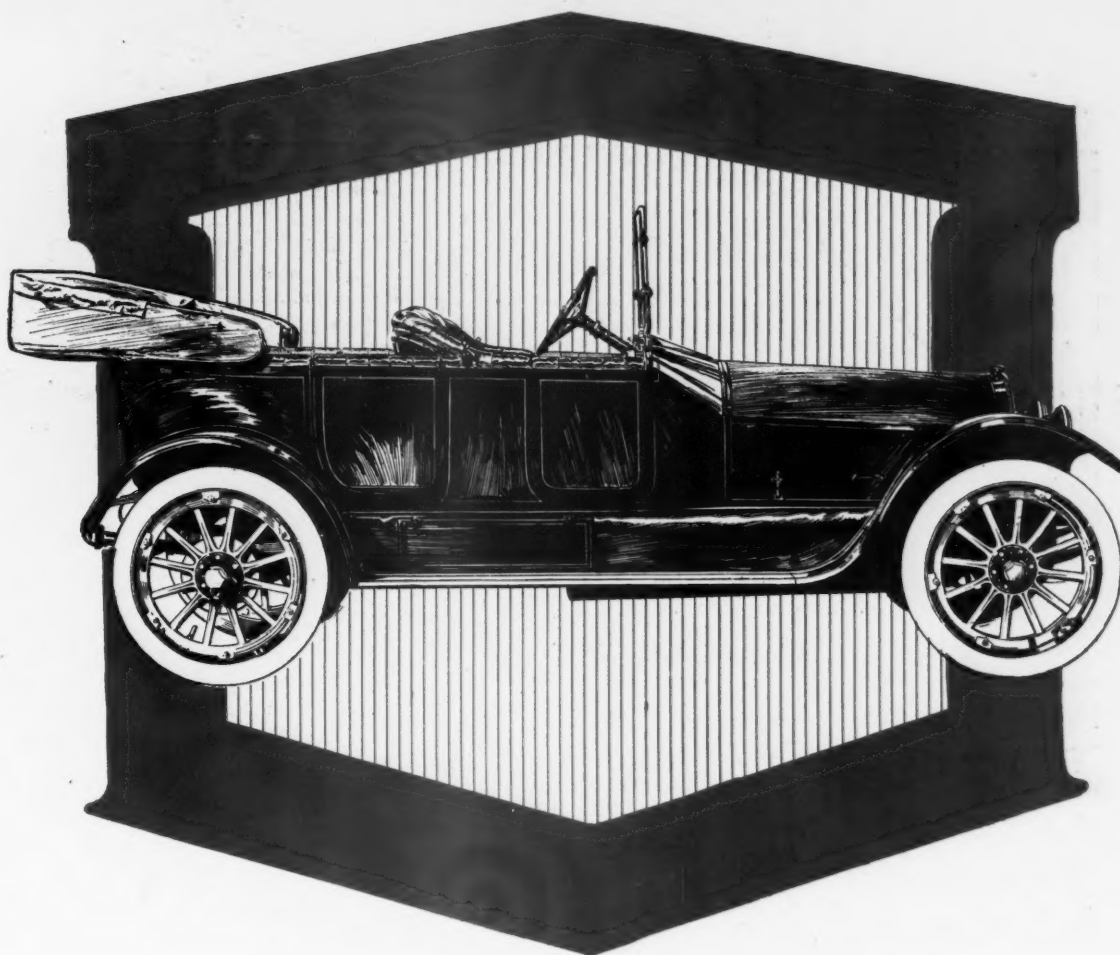
We will be glad to send you further information containing full description and prices.

ATWATER KENT MFG. WORKS

4938 Stenton Avenue,

Philadelphia, Pa.

When Writing to Advertisers, Please Mention Motor Age.



6 Cylinder
48 H. P.

Fully Equipped

Herff-Brooks

\$1375

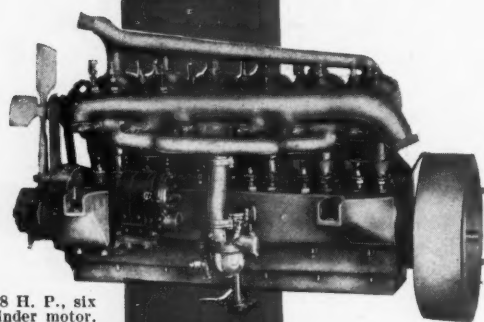
124 Inch Wheelbase

Electrically Started and Lighted

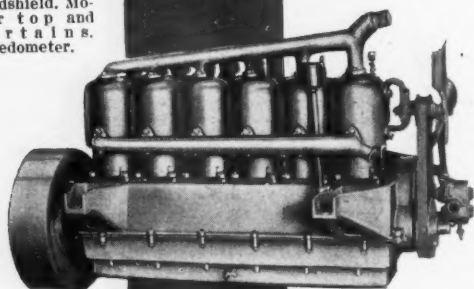


When Writing to Advertisers, Please Mention Motor Age.

Herff-Brooks



48 H. P., six cylinder motor, 4 inch bore and 4 1/2 inch stroke. 124 inch wheel base. Electric starter, lights and horn. Semi-Elliptic springs in front. 3/4 Elliptic springs in rear. One piece drop forged I beam front axle. 3/4 float-rear axle. Timken and New Departure Bearings. Demountable rims with extra rim. 18 inch steering wheel. Center control. Cone clutch. Clear vision windshield. Mohair top and curtains. Speedometer.



A Six Cylinder, 48 H. P. Car at \$1375 Is Something Entirely New, Isn't It?

You have never heard of anything like it, have you?

The new Herff-Brooks car is not only a six cylinder car, but it is a 48 horsepower car, and not only a 48 horsepower car but it sells for \$1375.

Just think of it! There is no other similar six cylinder car made for less than \$1575; and we guarantee the Herff-Brooks for \$1375 to be better than any other "six" for \$1750 and equal to any car selling as high as \$2000, regardless of specifications—or name.

There are only four elements concerned in the cost of any car:

- 1st:—The cost of materials.
- 2nd:—The manufacturing cost.
- 3rd:—The profit—

We are going to discuss these elements right here and now because they are interesting to both dealer and consumer and they explain our position in regard to the stability of our organization absolutely.

The Materials

The cost of automobile materials is perhaps the most vital factor in the selling price. There is, however, a marked difference between even the same parts.

Let us suppose for instance that you buy an "assembled" or "standardized" car.

That means that the motor car manufacturer buys those parts from a parts manufacturer who asks a profit not only on his raw materials; but also on his labor cost.

We manufacture almost every part in the Herff-Brooks Car. Therefore, we save the profit of the parts makers.

That's Saving Number One.

We also manufacture parts at a profit for other automobile builders; this profit is turned into the production of Herff-Brooks cars.

That's Saving Number Two.

Therefore, on materials alone we have two distinct savings—the parts maker's profit and the profit we make by selling to other automobile concerns.

The Manufacturing Cost

We build Herff-Brooks cars in one plant; we also conduct a profitable parts business in the same concern.

Consequently our factory works 300 days a year.

Most automobile builders experience a "slack period" during the year. They also go through an equivalent "rush season."

During the slack period men are laid off—and plants are closed. During the rush season when automobile laborers are in demand they must pay out exorbitant costs for labor.

Look around right now at the idle automobile plants—then look at our factories. Our men are working 10 hours every day—earning money for themselves and us.

That's the Third Big Saving.



We guarantee the Herff-Brooks "Six" for \$1375 to be the superior of any car selling for \$1750, and equal in value to any other car selling as high as \$2000.

We further guarantee that we are ready right now to deliver the Herff-Brooks "Six" in large shipments to any point in the United States.

The Selling Cost

Most automobile manufacturers in a like position would have a selling cost that was beyond all proportion to their business.

Our selling force is busy selling all the time. Either our own cars or the other products we make.

Because of the many savings we have effected through a sound and sane manufacturing policy we have been able to produce a car that knocks the bottom out of the automobile price question.

Herff-Brooks cars sell easily and without the usual red-fire and beating of drums.

Consequently with our output almost placed and our other business doing its usual volume we are able to reduce the selling expense.

That's the fourth big saving.

The Profits

Our method of conducting the manufacturing branch of our business is such that we derive two distinct profits from two distinct sources: 1st, automobiles and 2nd, automobile parts.

Our profits are ample; not excessive because that is dangerous, but great enough to pay us a satisfactory return on our investment.

Remember we have only one investment; but we have two sources of revenue; two profits.

That's the fifth big saving.

Realizing that profits are the basis of any business we have allotted our dealers a very liberal margin of profits for themselves.

We do this to insure *their* permanency in *their* business; to keep them with us year after year; thereby further reducing our selling cost.

It's only good business to make money ourselves and it's better business to make money for the dealers to whom we look for sales.

The Car Itself

The Herff-Brooks Six at \$1375 is the sensation of the automobile field this year.

Remember this is the lowest priced Six ever made and you now know the reason—also recall that we guarantee it to be better than any other car of \$1750 and equal to any car of \$2000 made.

Our "Competitors"

We don't know what "competition" will say in answer to this advertisement.

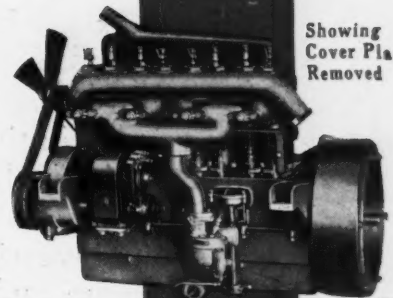
It's the first time "competition" has been asked to make such a comparison with so remarkable a car—at so remarkable a price.

So far as we're concerned we don't much care what they say.

We're building cars for our dealers and their people; not for competition.

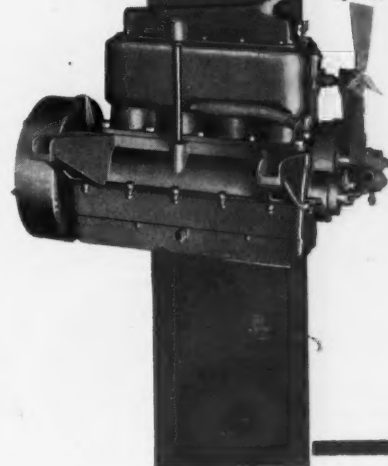
And the only competition we will have is with cars costing from \$1750 to \$2000; and that competition is a compliment.

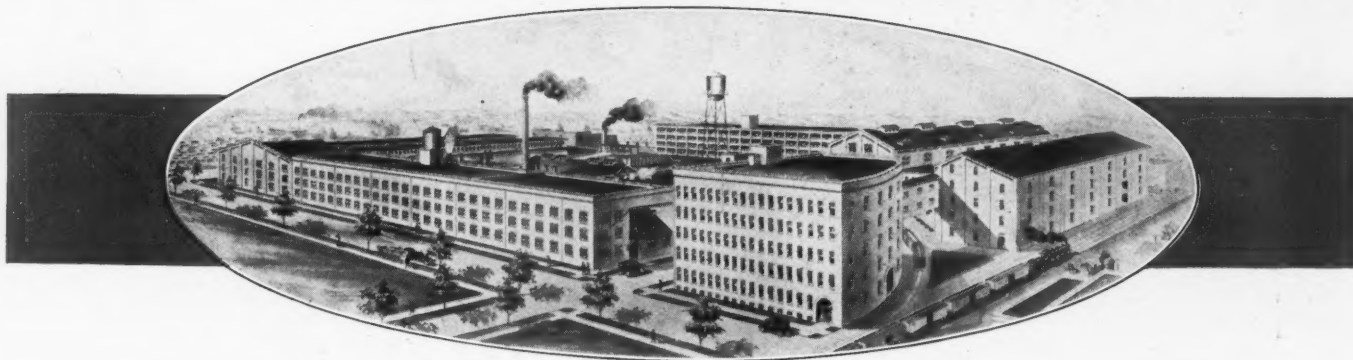
Herff-Brooks



Showing Cover Plate Removed

38 H. P. 4 cylinder motor, 4 1/4 inch bore and 5 inch stroke. 118 in. wheelbase. Electric starter, lights and horn. Semi-Elliptic springs in front. 3/4 Elliptic springs in rear. One piece drop forged I beam front axle. 3/4 float-rear axle. Timken and New Departure Bearings. Demountable rims with extra rim. 18 inch steering wheel. Center control. Cone clutch. Clear vision windshield. Mohair top and curtains. Speedometer.





We Will Pay Your Expenses Here! Start Today!

We want only the best dealer in each city to answer this announcement.

If you are one of the best don't stop to write, wire or telephone at our expense.

Even though haste is not always advisable, we cannot but urge immediate action—remember your competitor is reading just what you are reading.

If you are in the market for a car that must very soon lead the field in selling, get on the train and come to Indianapolis.

If your investigation proves satisfactory and you decide to become our representative in your territory we will gladly pay your transportation expenses both ways.

Remember this is the most striking sensation in the fold today—a big car—a powerful car—a handsome car—a six cylinder car—a profit-for-you car—that sells for \$1375. Also a four cylinder at \$1100.

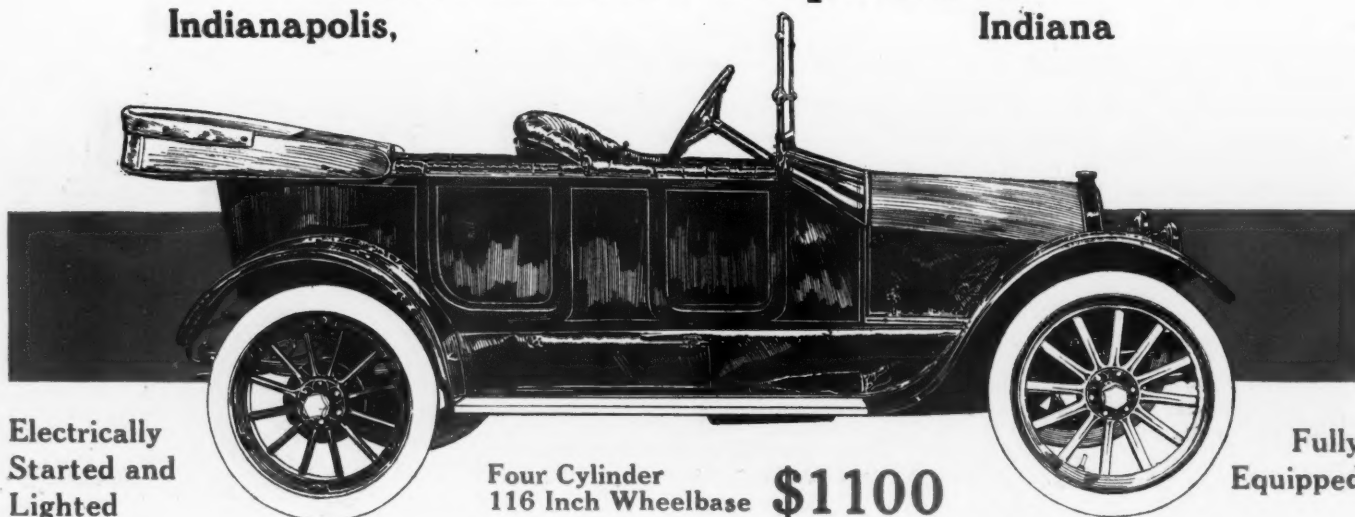
Some one in your city will make money selling the Herff Brooks Six—why not you?

Write for illustrated catalog M. A.

Herff-Brooks Corporation

Indianapolis,

Indiana



**Electrically
Started and
Lighted**

**Four Cylinder
116 Inch Wheelbase \$1100**

**Fully
Equipped**

When Writing to Advertisers, Please Mention Motor Age.

"The Master Is Faster!"

VANDERBILT CUP

- 1st** Master-equipped Mercedes, driven by DePalma.
2nd Master-equipped Mercer, driven by Oldfield.
3rd Master-equipped Mason, driven by Carlson.

GRAND PRIZE

- 2nd** Master-equipped Marmon, driven by Ball.
3rd Master-equipped Alco, driven by Taylor.
4th Master-equipped Mercedes, driven by DePalma.

All Equipped with Master Carburetors

Teddy Tetzlaff, driving a Master-equipped Fiat, drove the fastest lap in the Grand Prize at the rate of 86.6 miles per hour

In the Vanderbilt Cup Race there were fifteen contenders. Master-equipped cars led their field one, two, three! Sixteen entrants faced the starter in the Grand Prize. Three of the first four cars to finish were Master-equipped!

"To Burn Fuel Unrefined, The Master is Designed."

"In Design 'tis the Newest—Its Parts are the Fewest."

Only three moving parts: The rotary throttle, the regulated air damper and the float action.

Write for descriptive literature, explaining in detail the workings of this mechanically perfect carburetor.

MASTER CARBURETOR COMPANY, INC.

922-24 So. Los Angeles St.,

Factory and General Offices:

Los Angeles, California

LOOK THIS LIST OVER

And Figure Whether You Can
Afford Not to Exhibit at the Only
National Truck Show in 1914.

Boston Motor Truck Show

MECHANICS BUILDING

Auspices Boston Commercial Motor Vehicle Association, Inc.

MARCH 17 to 21

Abrams Co., Myer
Alma Motor Truck Co.
American Tire Co.
Atterbury Motor Car Co.
Autocar Company

Baker Motor Sales Co.
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Chase Motor Truck Co.
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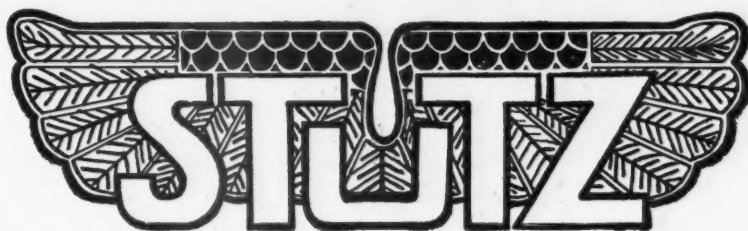
FEW DESIRABLE SPACES OPEN

For Particulars Write to

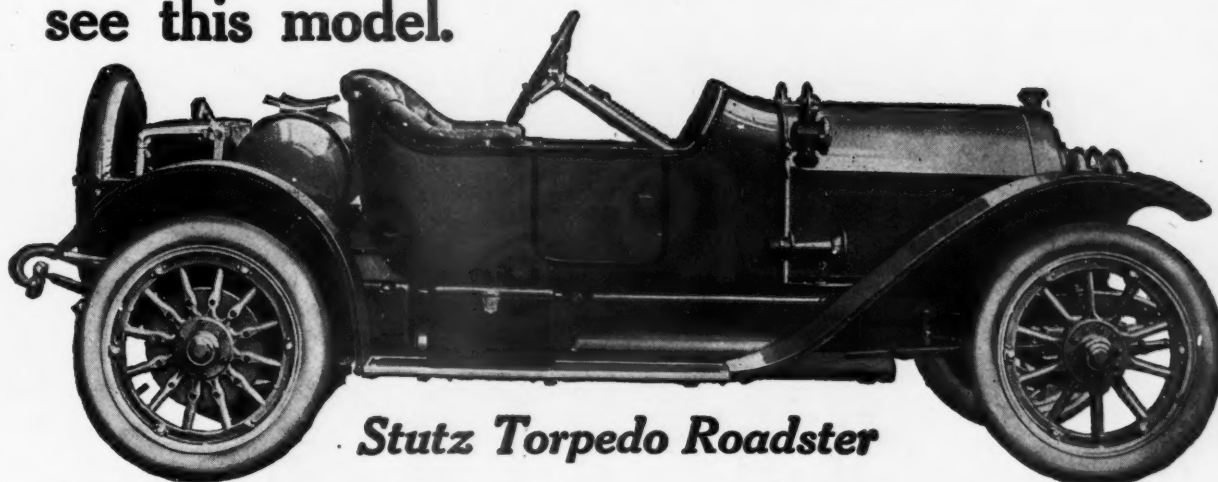
CHESTER I. CAMPBELL, 5 Park Square, Boston

When Writing to Advertisers, Please Mention Motor Age.

When you see this sign



—over a dealer's door—step inside and see this model.



Stutz Torpedo Roadster

First in the Marathon of Daily Service

Don't invest in any car till you have at least had the pleasure of a Stutz demonstration.

If you do not happen to be located where there is a Stutz dealer—write us for Sturdy Stutz booklet No. A-2—illustrating new Series E cars.

Four-Cylinder Touring	- - -	\$2150
Four-Cylinder Roadster	- - -	\$2000
Six-Cylinder Touring	- - -	\$2400
Six-Cylinder Roadster	- - -	\$2250

The Stutz holds the World's Road Race Record for cars in the 301-450 class—75.03 miles per hour. The Stutz has a record of which we are justly proud—not a single dissatisfied owner—the car that made good in a day—the car that makes good every day.

DEALERS: We are preparing to make contracts with a few more live dealers—get in touch with us quick. Ask for proposition and booklet A-2.

Stutz Motor Car Company of Indianapolis, U. S. A.



Bosch Wins as usual

100% Victories in Both

The Vanderbilt Cup Race

1st.	Mercedes	DePalma	Bosch Magneto and Plugs
2nd.	Mercer	Oldfield	Bosch Magneto and Plugs
3rd.	Mason	Carlson	Bosch Magneto and Plugs
4th.	Stutz	Cooper	Bosch Magneto and Plugs
5th.	Touraine	Joerimann	Bosch Magneto and Plugs

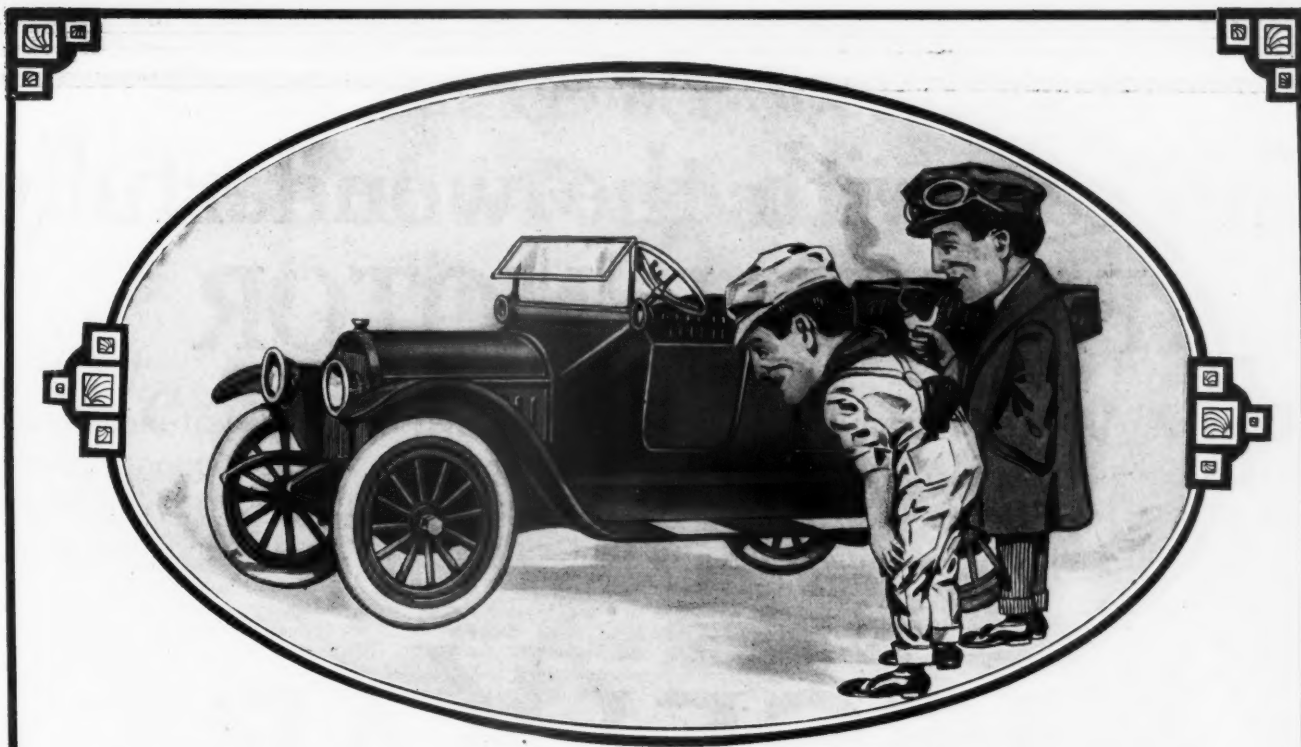
The Grand Prize Race

1st.	Mercer	Pullen	Bosch Magneto and Plugs
2nd.	Marmon	Ball	Bosch Magneto and Plugs
3rd.	Alco	Taylor	Bosch Magneto and Plugs
4th.	Mercedes	DePalma	Bosch Magneto and Plugs

Be Satisfied

Specify Bosch

BOSCH MAGNETO CO., 214 W. 46th St., New York



**"All these months of Soapy Water
Washing haven't dulled it a bit"**

Valentine's Vanadium Varnishes

**Will resist Soap, Road Oil, Mud, Heat
Twice as long as any other
For the Hood and Fenders
Vanadium Chassis Finishing**

*Write for our booklet, "The Care of the
Car". It tells how to keep your car new.*

VALENTINE & COMPANY

Largest Manufacturers of High Grade Varnishes in the World

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FILL IN—TEAR OFF—MAIL TODAY
VALENTINE & COMPANY, 456 Fourth Ave., New York
 Check here Owner... Garage... Paint Shop... (M.A.)
 Name
 Address
 Please send me free copy
 of your booklet, "The
 Care of the Car".

The car with the wonderfully FLEXIBLE MOTOR

The KisselKar is built up around a power plant that is a marvel of mechanical perfection. The motor is famous for its dependable power, silence, smoothness in action and responsiveness. It is the exceptional flexibility of the KisselKar motor that practically eliminates gear shifting and makes the KisselKar unusually safe and easy to drive.

KISSELKAR

The three touring models that constitute the present KisselKar line offer an unequalled range of selection for the seeker of the right high grade car.

The 40 "Four" at \$1850 is, point by point, the peer of any four cylinder car on the market, plus individual and exclusive features of its own.

The 48 "Six" at \$2350 is the year's best value in light "sixes," a car of beauty, refinement, completeness—a thoroughbred in every detail.

The 60 "Six" is the last word in motoring luxury—a big seven passenger automobile that answers every demand of the particular buyer.

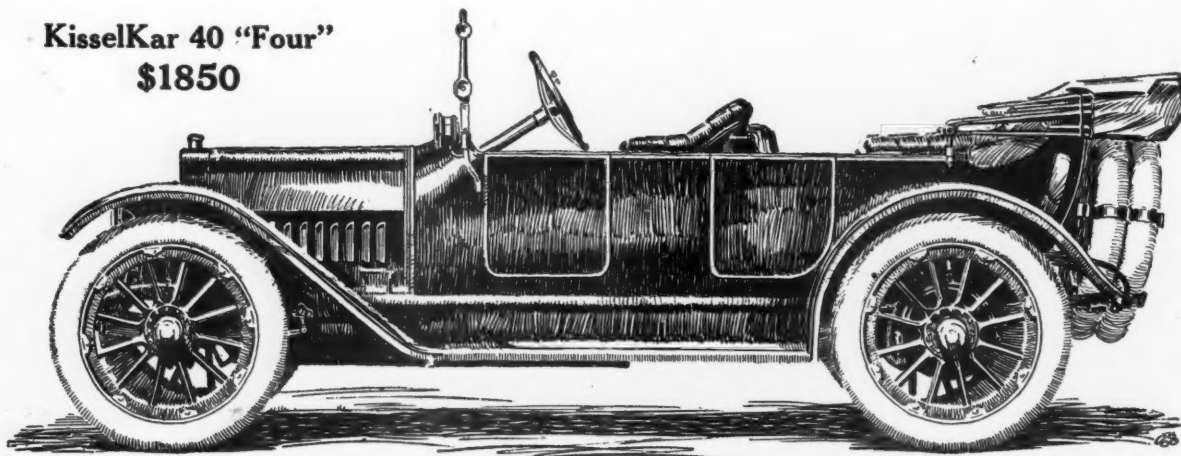
KISSELKAR SERVICE is SERVICE DEFINED—a written and specific contract with owners that clearly stipulates what you are entitled to. Our Service Stations at all principal points are equipped to relieve owners of all mechanical detail. There is no other service like it.

KISSELKAR TRUCKS—Six Sizes—1500 lbs.—1, 1 ½, 2 ½, 3 ½, 6 tons.

KISSEL MOTOR CAR COMPANY, 121 Kissel Ave., Hartford, Wisconsin

BOSTON, NEW YORK, CHICAGO, MILWAUKEE, KANSAS CITY, MINNEAPOLIS, ST. PAUL, DALLAS, SAN FRANCISCO, LOS ANGELES, OAKLAND, Philadelphia, Detroit, Houston, El Paso, New Orleans, Washington, Baltimore, Nashville, Duluth, Buffalo, Pittsburgh, Hartford, Conn.; New Haven, Albany, Troy, Rochester, Providence, St. Louis, Marshalltown, Iowa.; Omaha, Hastings, Neb.; Madison, Montreal, Quebec, Toronto, Winnipeg, Calgary, and 300 other principal points throughout America.

KisselKar 40 "Four"
\$1850



Every Car Owner Should Read "Care and Repair of Tires" We Send It FREE

It's a book every motorist will value highly because of the practical information it contains on tires—their care and repair.

Understand this book is not merely an advertisement for Shaler Vulcanizers. It tells the proper inflation you should maintain in your tires according to weight, load and seasons. It describes fully how to protect the tires while car is idle in the garage—how to care for them in winter—how to avoid substances that rot the rubber and fabric. It gives splendid hints on the spare tire and its care—how to carry extra tubes. Sensible information on the tire sleeve, the blow-out patch—on repair plasters and plugs and emergency or temporary repairs. It explains fully how easy it is to vulcanize and make your own repairs. This book has made such a big hit in Automobile Circles because of its accurate and reliable information that the leading American and Foreign Automobile Publications quote it as an authority. It's free. Just use the coupon.

SHALER Vulcanizers

**The Only Vulcanizers with Automatic Heat Control
Prevent Blow-Outs—Save Your Tires—Save Repair Bills**

They enable anyone—who can drive a car—to repair permanently any blow-out, puncture, rip, tear or hole in either the casing or inner tube.

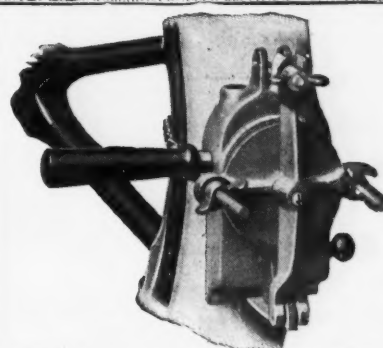
The Shaler, because of its scientific principle of construction, gives a thorough vulcanization and leaves the repaired spot the strongest part of the tire.

It is an impossibility to overcure or undercure the tire because of the automatic heat control—an exclusive Shaler feature. No need to watch it at all. It works automatically. Just clamp to the tire and the repair is quickly completed.

Shaler Vulcanizers are the standard and are used in the best garages and repair shops everywhere. The Shaler is the *only* complete line for either the private one-car garage or the public garage of many hundred cars. We

are the world's largest makers of vulcanizers and started this business at the advent of the pneumatic tire. We make vulcanizers of every type—Electric (heats from city lighting current), Gasoline, Alcohol and Steam—for every need and purpose, from the Safety Vul-Kit at \$3.50 and Model D at \$12.50 (for the home garage) to a complete Garage Equipment.

Put a Shaler Vulcanizer in your garage and watch your tire expense go down. It's the little holes, cuts and crevices that you ordinarily let go that grow bigger and bigger and in time ruin the tire forever—which if you had vulcanized in time while the cut was still small, the repair would easily enable the tire to give treble the mileage. The secret of securing the utmost mileage is *keeping* the tires in *good condition*—not waiting until they are too far gone. A Shaler part of your repair outfit pays for itself.



Shaler Safety Vul-Kit

The motorist's inexpensive outfit can be carried in the tool box for emergency repairs to tubes and casings. It mends tube punctures and small casing cuts as perfectly and permanently as the most elaborate outfit. Absolutely safe. Burns gasoline or alcohol—an exclusive Shaler feature. No watching, no regulating; simply fill the cut or puncture with new rubber, clamp on the vulcanizer—fill and light the generator. The fuel supply is limited to that required for perfect vulcanization. You can't overcure or undercure a repair. Handle always cool. Anybody can use it. Furnished complete with repair material—everything but the fuel. Fully nickeled. Type G 32 Shaler Safety Vul-Kit, \$3.50.

\$3.50

You Need a SHALER Vulcanizer

Garage or Dealers Coupon

C. A. Shaler Co.
209 Fourth St., Waupun, Wis.

Send me catalog, dealer terms
and free book "Common
Sense About Tire Repairs"
(for dealers and garages only.)

Name.....

Street.....

City..... State.....

Do you sell accessories?.....

Have you a repair department?.....

Jobber's Name.....

Every motorist does—just as much as they need a spare tire. It's the most essential part of the repair outfit. It is necessary to keep tires in good condition just as lubricant is needed to keep the car in good running order. Shaler Vulcanizers are sold by all good dealers everywhere. If your dealer does not handle them, mention his name in the coupon when you send for our free book and we will tell you where you can see and examine a Shaler if you want to. Don't neglect to send for this valuable book—get the facts about tires.

Necessary in Every Garage and Repair Shop

\$15 to \$20 a day more profit can be made vulcanizing tires with Shaler Vulcanizers. They are guaranteed and are the standard everywhere. They are the only vulcanizers with the Automatic Heat Control insuring perfect results. Every garage and repair shop should have one. Get our free book, "Common Sense About Tire Repairs." Hardware dealers and dealers in Automobile Accessories can easily add to their sales and profits by handling Shaler Vulcanizers for the home garage. The only accessory needed by every motorist that is never supplied as part of any car's equipment.

C. A. Shaler Co., 209 4th St., Waupun, Wis.

Canadian Distributors—John Millen & Son, Limited—
Toronto, Winnipeg, Montreal, Vancouver, Victoria

Car Owners' Coupon

C. A. Shaler Co.
209 Fourth St., Waupun, Wis.

Send me your free book,
"Care and Repair of
Tires," and catalog of Shaler
Vulcanizers

Name.....

Street.....

City..... State.....

From whom do you buy your Auto Supplies?.....

When Writing to Advertisers, Please Mention Motor Age.



BRAENDER TIRES

**WIN
FIRST SECOND
THIRD FOURTH
IN VANDERBILT CUP RACE**

History of racing throughout the world is that many tire manufacturers employ racing drivers in the hope of victory that will lend fame to their particular make of tires, or they give premiums to drivers and supply free tires to those men who risk their lives on speedway and track.

But here is a different story—one worth the serious attention of every motorist, whether racing driver whose life and whose victory depend upon tire safety, or gentleman motorist who values not only the safety of his passengers and self, but who insists upon freedom from roadside annoyance (due to failure from inferior tire construction) and smallest cost per tire mile.

On the opposite page is set forth a record of some important racing victories made upon Braender Tires.

The winners of these big events **KNOW** tire quality. They use and insist upon Braender equipment—**AND THEY PAY FOR THEIR TIRES THE SAME AS ANYONE ELSE.**

Quality is the reason. Braender tire quality made DePalma's victory possible.

Good tire quality with us is not an accident. These continuous victories are proof positive of the fact. Every Braender tire is "made"—not manufactured. Quantity production has never been our aim.

Quality? Always



BRAENDER TIRES

When Writing to Advertisers, Please Mention Motor Age.

NEVER EQUALED TIRE RECORDS

On February 26th, Ralph DePalma, participant in scores of hard fought contests, won his second Vanderbilt Cup race, on the Santa Monica course. His time was 3:53:41. DePalma, with Braender Tires, made the victory at an average speed of 75.6 miles an hour. It is freely admitted by all those who witnessed the contest that DePalma's victory was because of the fact that throughout the entire grind of 294 miles he was not required to stop for a change of tires. This is admittedly the greatest victory on record, and is a wonderful commentary on tire quality.

Oldfield finished second, Carlson third, and Cooper fourth. All drove on Braender Tires. This, and the following record of past consistent performance, is the best evidence we know of to substantiate the claim that Braender Tires are the best in the world.

At Indianapolis last Decoration Day, Ralph Mulford drove the entire 500-mile International Sweepstakes Race on one set of Braender Tires, *without a single tire change*, making an average speed of 67 miles per hour. Think of the terrific heat, the grinding friction, the smashing strains his tires withstood so successfully.

At Columbus, Ohio, July 4th, Mulford won the 200-mile race on Braender Tires, *without a change*. At Elgin, Ill., August 30th, Gil Anderson won the 301-mile Elgin National Trophy Race with Braender Tires. Mulford took second place, driving the entire race on Braender Tires *without a change*. Bergdoll and Haupt also used Braender Tires *without change*. Mulford's tires were the same set he used the day before in the C. A. C. Trophy Race, and drove five races, winning two, at Galveston a few days previous, a total of 900 miles. The same tires were used in the races at Sioux City, Minneapolis, Milwaukee, Detroit and the 100-mile race at Cincinnati, *all without a change*.

Braender Tires have established the World's Record for tire endurance and quality. You can buy the same quality tires from any Braender Dealer. They are unquestionably the strongest, most durable and most economical tires in the world. How can you afford to use any other?

BRAENDER RUBBER & TIRE CO.

Branch: New York, 1987 Broadway
Main Office and Factory: Rutherford, N. J.

Agents and Dealers

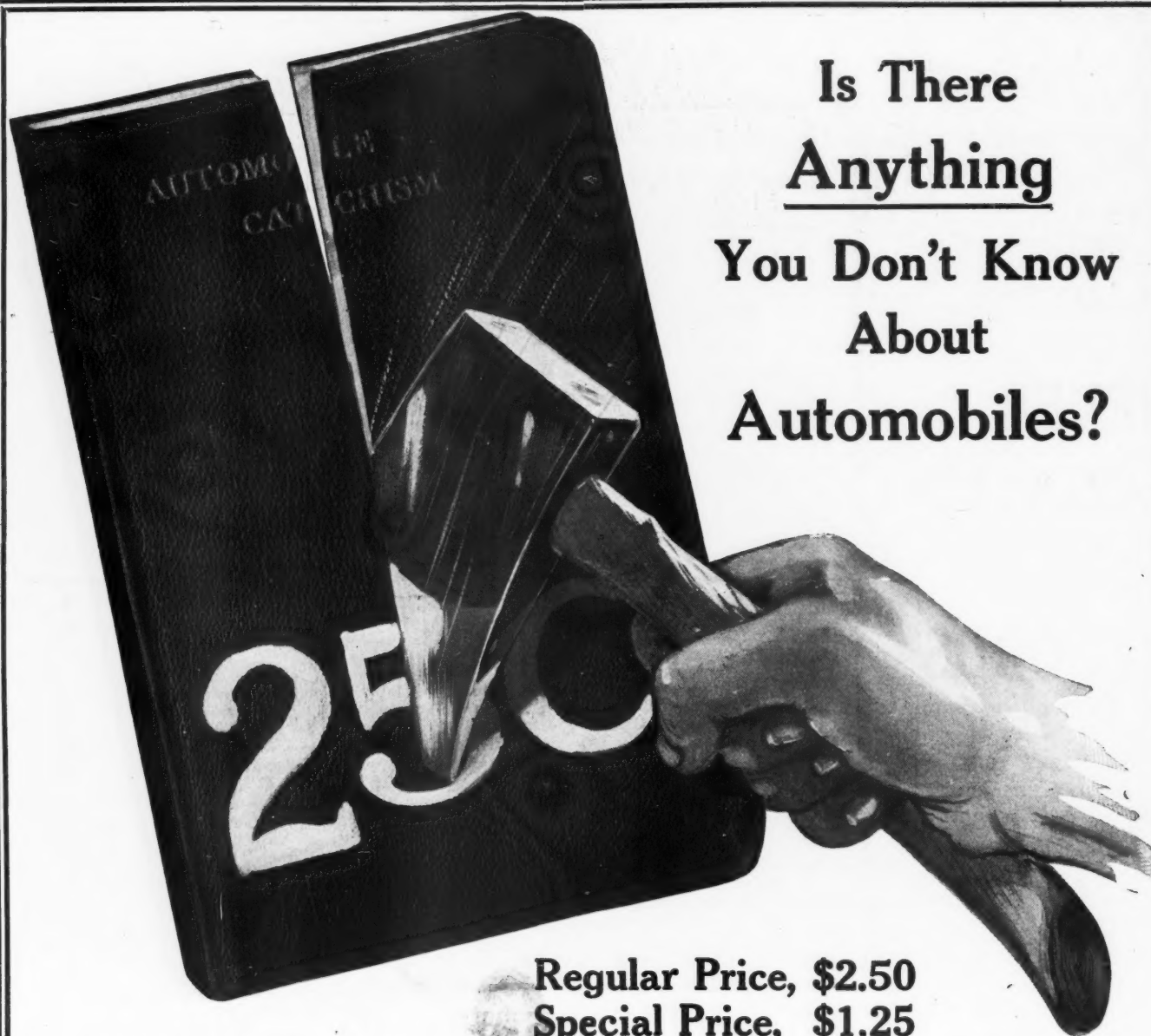
Keystone Motor Supply Co., 3302 Grant Boulevard,
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Alfredal Co., 1467 Michigan Ave., Chicago, Ill.
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J. R. Johnson, Greenwich, Conn.
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E. B. Quarles & Co., 1922 N. Charles St., Baltimore, Md.
Crist Matheson, 43 Summer St., Stamford, Conn.
Ketcham & Lawrie, 259 Halsey St., Newark, N. J.
G. H. Snyder, 465 Fulton St., Troy, N. Y.
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Sears Auto Co., Des Moines, Ia.
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Dayton Tire Co., 580 Boylston St., Boston, Mass.

We have a special proposition
for dealers



ALWAYS WIN

When Writing to Advertisers, Please Mention Motor Age.



Is There
Anything
You Don't Know
About
Automobiles?

Regular Price, \$2.50
Special Price, \$1.25

THE AUTOMOBILE CATECHISM" (de luxe edition) is a complete course in automobile instruction—every subject discussed and illustrated so that YOU will grasp every point worth while—every bit of mystery is made as simple as A B C. You are interested—you are instructed—you are directly benefited. Its information is final.

It's a handsome piece of book work—splendidly printed, with 101 illustrations; flexible black leather binding, rounded corners and gold-edged pages—beautiful, while being intensely practical.

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JOURNAL
COMPANY

900 S. Michigan
Ave., Chicago, Ill.
231 W. 39th St.,
New York, N. Y.

Gentlemen:
Enclosed please find \$1.25,
for which send me a copy of
"The Automobile Catechism"
(de luxe edition).

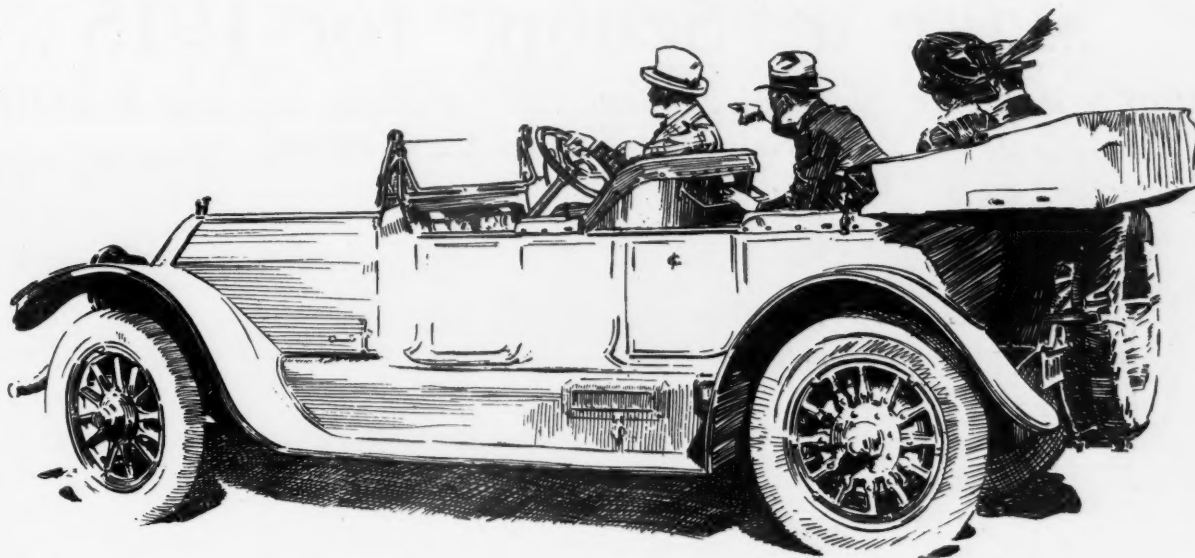
Name.....
Address.....

It will be to your immediate financial advantage to acquire an intimate and practical knowledge of cars and their parts. Lack of knowledge is expensive.

We want every reader of Motor Age to have a de luxe copy of "The Automobile Catechism." To make our offer irresistible we have decided, FOR A LIMITED TIME ONLY, to CUT THE PRICE IN TWO. This half price (\$1.25) will prove the best investment you ever made. Remember, this is the de luxe edition—264 pages—every page full of real, money-interest value.

Put your name and address on the corner coupon, tear from the page, enclose \$1.25 and mail today to—

THE CLASS JOURNAL [COMPANY
900 S. Michigan Avenue Chicago, Ill.
231 W. 39th St. New York, N. Y.



For the Serious Attention of Every Dealer Who Is Handling a Line of Cars Selling Below \$2000

The most successful dealers today are those handling a line of cars diversified enough to appeal to the large possible number of buyers.

Many dealers in the lower price class have preferred, however, to confine their attention to that field, rather than branch out into the higher price class, on account of the growing trend of buyers towards the purchase of cheaper cars.

In view of this, there is one high-grade car today, which stands out above all others as being a profitable proposition for the lower price dealer to add to his line.

The Havers—The Big Man's Car

This car occupies a field of its own. It is as high grade, as large, of as fine appearance, and as luxurious as any car built anywhere, yet sells for only a few hundred dollars more than is asked for the small Sixes.

Think of the appeal the Havers will make to a man who has driven the highest-priced cars, but who feels that he ought to buy a cheaper one this year. The Havers offers him all of the power, speed, comfort and luxury that he has been accustomed to, but at a price from one to two thousand dollars less than he has formerly paid for these qualities.

Think of the appeal the Havers will make to the hundreds of motorists who have been driving smaller cars, but who have always had that longing—common to most men—to some day own a really big, luxurious car. They will find that the Havers will satisfy this ambition and at a moderate price.

Get all the available information regarding the Havers. Plan to see and examine a Havers. You can instantly prove for yourself these things we have told you about the Havers.

Send us a postcard request for further information.

6-60—\$2485

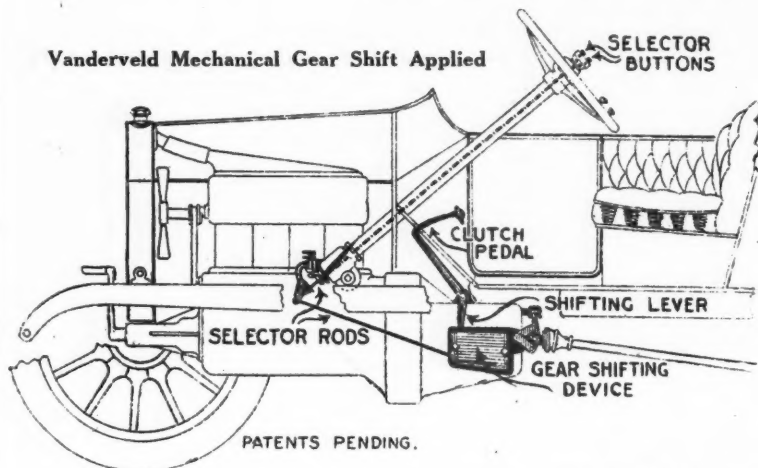
6-44—\$1985

HAVERS MOTOR CAR COMPANY

Port Huron, Michigan

Make a "Scoop" for 1915

Adopt a Positive *Mechanical Gear Shift* Device for the Benefit of Your Sales and Your Customers



S ELECTION of gear by *Mechanical Push Button* placed at top of steering column, gives the driver added **Comforts** and makes gear shifting a **Pleasure** in traffic, on hills and difficult roads. Eliminate the hand-gear shift lever. This *Mechanical Gear Shift* is readily mounted with practically no change necessary by the motor car builder. Invaluable for commercial cars. Guaranteed by a company of unsurpassed business reputation.

GET PARTICULARS NOW

Grand Rapids Show Case Co.

Engineering Department

Grand Rapids, Mich.

BUDA MOTOR

A LETTER FROM A CAR MANUFACTURER

"We have nothing but the highest words of praise for your product and have not failed at every opportunity to advertise that **WE ARE INSTALLING THE BUDA MOTOR** in our machines."

We like to receive, and do receive, many letters like the one from which this is an extract. The letter is from the manufacturer of a very remarkable car. We will give you the name if you ask it.

The Unequalled Buda Six

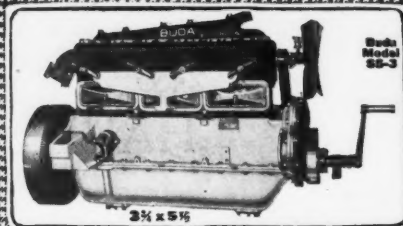
is being adopted by the manufacturers of some famous fours who are now adding the Six to their lines, because The Buda Six, Models "SS-3" and "SS-U" has *no superior* in the whole automobile field, no matter what the price. Both scientific and practical tests will prove this for any interested manufacturer.

THE BUDA COMPANY

FACTORY, HARVEY, ILL. (Chicago Suburb)
Address all correspondence to our **FACTORY REPRESENTATIVES**

BRANDENBURG & COMPANY

1108 S. MICHIGAN AVE., CHICAGO FORD BLDG., DETROIT
57TH & BROADWAY, NEW YORK CITY



Ask the Engineering Department of Your Car
for their opinion of Gabriel Snubbers. They have tested them out and know what they will do.



As easy to attach as
a pair of lamps.
Nothing to work
loose, rattle, wear
out or require re-
adjustment.

GABRIEL SNUBBERS

**\$15, \$20, \$25, per set of Four; two front and two rear.
Half this per pair**

Used with success on every type, make and size of car, except the underslung.

Standard Factory Equipment on Peerless, Stearns, White, Oldsmobile and Lozier. Partial or special equipment on over twenty other leaders. Universally recognized as a necessity on large cars—needed even more on small cars owing to shorter wheelbase and less expensive spring suspension.

Stop and think of the added comfort, and of the actual saving in upkeep expense, to say nothing of the thousands of miles more service your car will give when protected by Gabriel Snubbers.

GABRIEL HORN MFG. CO., 1415 East 40th Street **CLEVELAND, OHIO**
We also manufacture the famous GABRIEL Musical Horns and Windshield Cleaners

In Meriden, Conn., is a certain Model X, Stevens-Duryea, on which good tires averaged, with patching, 3000 to 3500 miles. In December, 1912, three Englebert Tyres were put on.

January, 1914. The owner reports "6100 miles and still going", with the air of year before last.



TYRES

MADE IN BELGIUM

ENGLEBERT

ENGLEBERT TYRE CO., 1928 BROADWAY, NEW YORK

When Writing to Advertisers, Please Mention Motor Age.

Makes Pumping Tires by Hand
EASY
The SMITH EASY PUMPING TIRE VALVE



Without the Smith Valve



With the Smith Valve

SINCE THE BEGINNING OF THE automobile industry all tire valves have been alike. This has been the chief reason it has always been a back-breaking job to pump a tire by hand. **The tire valve was at fault.** Before the appearance of the SMITH Easy Pumping Tire Valve, motorists and even some of the shrewdest tire manufacturers, failed to realize that a tire could be pumped by hand easily. They thought back-pressure of the air in the tube against the valve stem made hand pumping such hard work. They were wrong. The cause of the hard work was the great pressure needed to open the old-fashioned valve to admit the air to the tube.

VITALLY NECESSARY TO POWER PUMP OUTFITS

SMITH Tire Valves enable power pumps to inflate tires in a fraction of the time formerly required. They lengthen the life of the power pump, save fuel, and wear and tear on your engine.

SMITH Tire Valves can be instantly attached to the stem of your present valve—can be used on new tubes over and over again.

PRICE \$2.00 PER SET OF 5

At your dealer's or direct on receipt of price.

SMITH TIRE VALVE CO., 7 Doane St., Boston, Mass.

SEE US AT THE BOSTON SHOW, SPACE 534

AGENTS WANTED EVERYWHERE



Smith Tire Valve

Model "30"

Fully Equipped \$1195

Glide

A good, strong guarantee goes with every Glide car.

And this guarantee is backed by a conservatively managed concern of 32 years' standing. Your protection is secure. Glide sales are increasing every year.

The new model "30" Glide at \$1195 has every feature you want and all any one could ask for. It's in the thoroughbred class with the Glide "36" which sells for \$1840.

Dealers: Write for catalogs and proposition.

The Bartholomew Co.
215 Glide Street
Peoria Illinois

Glide

"30" Features

- Westinghouse Electric Starting, Lighting and Ignition System
- Unit Power Plant
- Long Stroke Motor
- Center Control
- Left Side Drive
- Gasoline Tank Under Cowl Dash
- 114 in. Wheelbase
- Motor Driven Tire Pump
- Floating Rear Axle. With Pressed Steel Housing
- Demountable Rims
- Tire Irons for Extra Tire
- Stream Line Body With Concealed Hinges and Built-In Windshield



A Warning Against Dishonesty

Messrs. Manufacturers, Dealers and Motor Wise Owners:—If you owned the Basic Patent Rights on so indispensable an article as the Original **KANTALEVER** Emergency Spring Repairer, you surely would warn all overly ambitious imitators against infringing and deceiving the trade and motoring public, in attempting to manufacture and sell a cheap imitation of the only Genuine Spring Repairer—the **KANTALEVER**.

Protection to the Trade and to the Motor Wise

The **KANTALEVER** Emergency Spring Repairer is only manufactured by the Electra Mfg. Co., N. Y., for The Motor Car Equipment Co., the Sole Owners of the Basic Patent Rights on Spring Repairers, as exemplified in the Matchless

KANTALEVER

Emergency Spring Repairer

Made of 50-Point Carbon Steel, Drop Forged, and guaranteed not to break under the strain of any load.



A bad break in an elliptic spring, bridged over and spring supported by a KANTALEVER.

Price, \$3.50

Can be attached in various other positions and on all types of springs.

OUR ULTIMATUM

We hereby notify the public that we will promptly prosecute all imitators and infringers of our Patent Rights on the **KANTALEVER** Emergency Spring Repairer, said patents being dated September 22, 1908, and October 27, 1908. This is our Ultimatum.

The Motor Car Equipment Company, 55-C, Warren Street, **New York City**

Sole Sales Agents

Manufacturers, Importers, Wholesalers **AUTOMOBILE ACCESSORIES AND SUPPLIES**

Enduring Quality Proven

The persistent, constant and strenuous stresses of race track speed prove the superiority of New Departure Ball Bearings.

Thirty-nine winnings, twenty-six seconds, and eleven thirds, over a total of twenty-eight other motor cars, including foreign racing models, is the story of the New Departure equipped Mason Car the past season.

The American-made New Departure is guaranteed. Literature on request. Special Cyclecar data will be sent if you are interested.

The New Departure Mfg. Co., Bristol, Conn.

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The "Goat"

Greatest Little Trouble-Taker on the Road

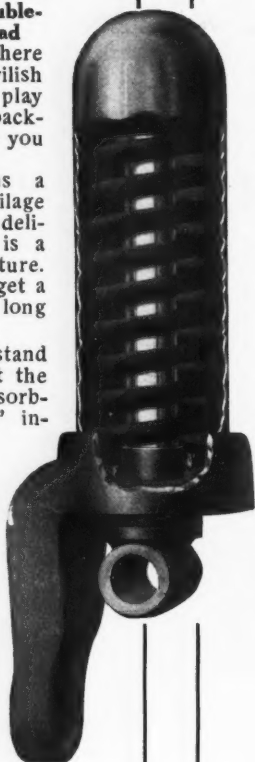
Mr. Car Owner—there are a hundred devilish jolts waiting to play havoc with your backbone the next time you take a long ride.

Every jolt means a mashing of cartilage and a yanking at delicate nerves. It is a smash-up in miniature. That is why you get a lame back after a long run.

You don't need to stand for the jolts. Let the Halladay Shock Absorber be the "goat" instead of your backbone. The Halladay is made especially to take and kill instantly every shock, before it can be transmitted to the body springs.

Save your eyes, your nerves, your backbone, by installing a Halladay Shock Absorber. Put your car in the Packard class of easy riders.

Install the Halladay and forget that there are poor roads.



HALLADAY SHOCK ABSORBERS for Ford Cars

The Halladay Shock Absorber combines features that no other form of absorber contains. It works directly over the axle, thus absorbing the shock instantaneously. The action on the springs is **direct**—no cramping nor binding. Springs are packed in grease and will lubricate automatically. Dustless, leakless, handsome. Strictly high quality. Guaranteed.

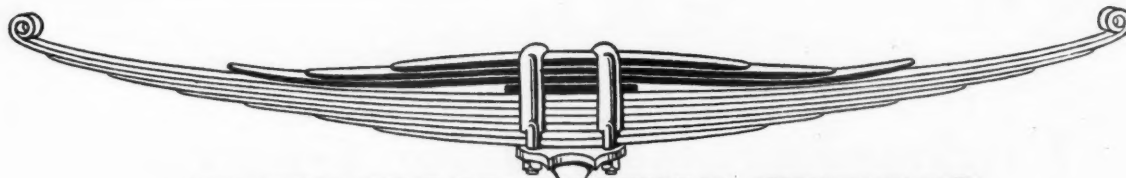
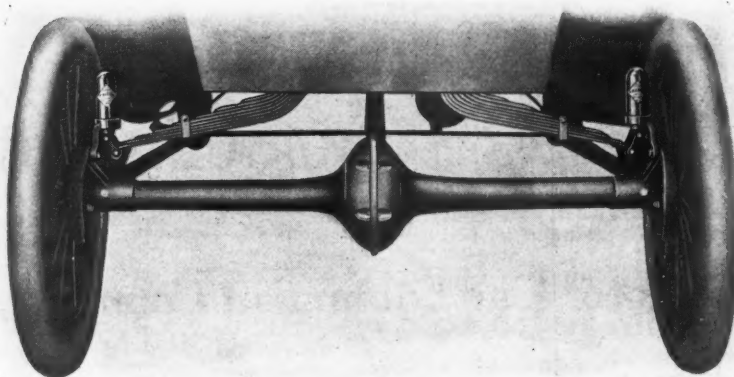
Saves car, reduces tire expense one-fourth to one-third. Applied in 20 to 30 minutes without machining.

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\$7.00 per pair front or rear. **\$12.50** for set of four. Send today under our absolute guarantee.

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The Ames is now established as the superior of any device for absorbing shock—preventing vibration, pitching and body-sway and absolutely protecting the spring against breakage.

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1 1/2" wide.....	\$8.00 per pair	2" wide.....	\$12.00 per pair
1 3/4" wide.....	\$10.00 per pair	2 1/4" wide.....	\$14.00 per pair
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Write nearest Branch for Booklet

H. W. JOHNS-MANVILLE CO.

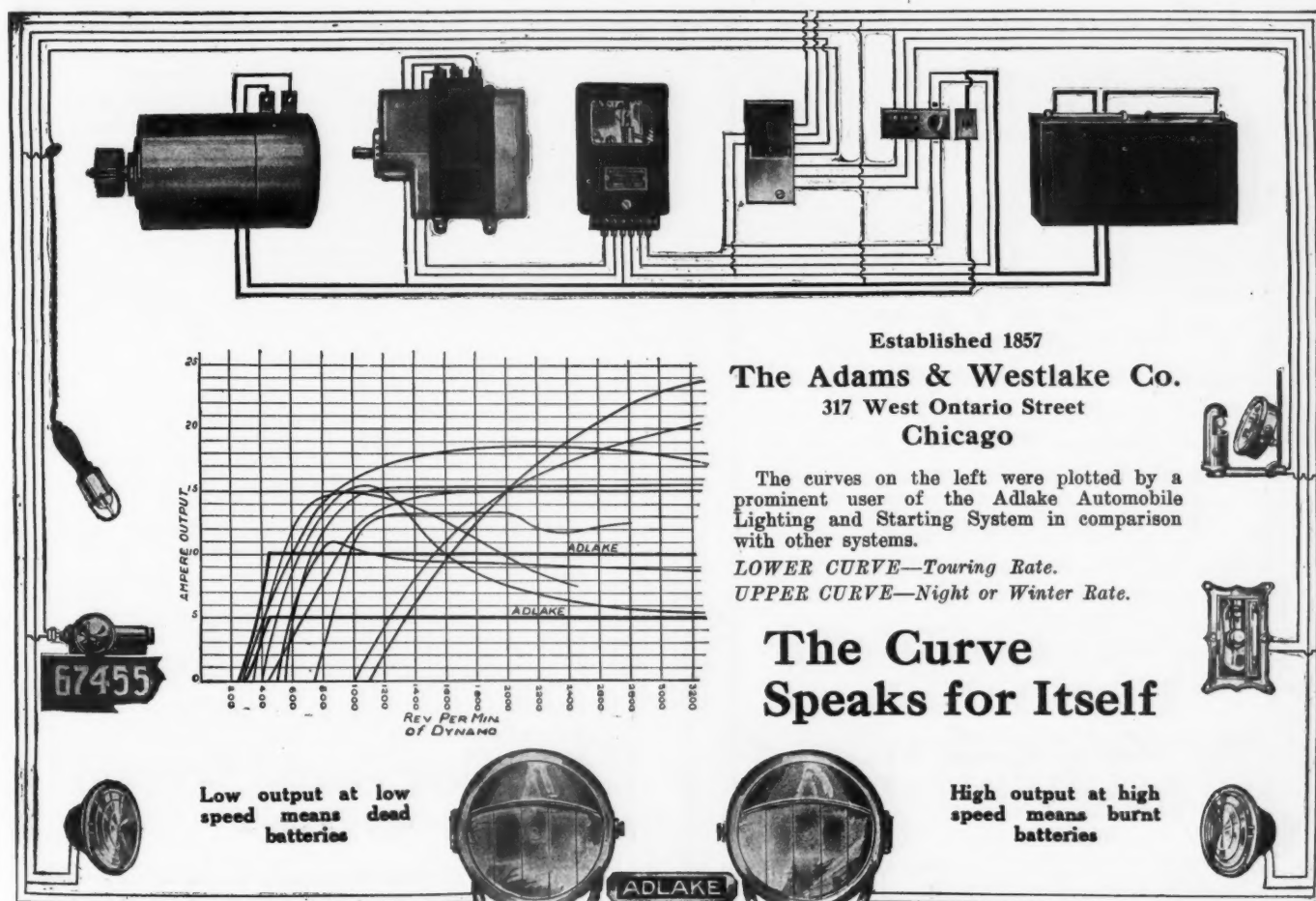
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Automobile Lamps

are accepted as standard equipment because of the continuous and satisfactory service they give with any good lighting system.

EDISON MAZDA Lamps are the most sturdy, efficient and powerful lamps it is possible to make for automobiles—they are backed by MAZDA Service.

Insist on EDISON MAZDAS on your new car or when replacing bulbs—have your car "Fully Equipped" with the lamp approved by engineers who build the car and who design the lighting system.

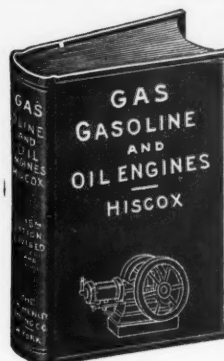
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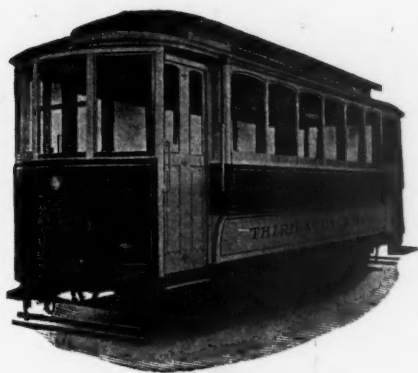
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SAVES 15%
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The Pyrene Extinguisher is convenient in size, has the maximum of efficiency, is easily operated, presents a handsome appearance, and Pyrene brass and nickel-plated extinguishers are the only types that qualify to pay part of your insurance.

Once knowing the value and true economy of the Pyrene Extinguisher, every careful motorist will make it a standard part of his car's equipment—because Pyrene protects his life as well as his investment—provides safety for his garage, and obtains for him a substantial insurance reduction.

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Brass and Nickel-plated Pyrene Fire Extinguishers are the only one-quart fire extinguishers included in the lists of approved Fire Appliances issued by the National Board of Fire Underwriters.

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Equip your tires with Interlock Inner Tires, and avoid all the bother, annoyance and expense of tire trouble. Five years' successful use in over a quarter million tires has clearly proved that they positively make tires *Blow-Out Proof* and *Practically Puncture Proof*.

Owners who have used Interlocks one season would not be without them at any price for Interlocks not only free you from tire trouble, but make a big saving in tire expense. An \$8 Interlock—will double the mileage of a \$24 tire—saving \$16 or twice its cost.

INTERLOCKS

Are Now Guaranteed Against Blow-Outs for One Year

No such radical guarantee has ever been made on a tire re-inforcement, and it is only made possible by the fact that Interlocks have *made good* in over a quarter million tires, and *positively proved* that they make tires *Blow-Out Proof*.

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Dealers — Send for New 1914 Prices

and Catalog of our complete line of Interlock Inner Tires, Tire Re-inforcements, Reliners, Inner Shoes, Outer Boots, Patches, etc. We are the Originators and Largest Manufacturers of Tire Re-inforcements. Let us tell you what we are doing to help dealers sell Interlocks. It will pay you to investigate Interlocks. Our large advertisements in the national publications have created a big demand. Write now—before you forget—for our Dealers Proposition.



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Fabric
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Added, are many features unique in modern hotels, Hydro-therapeutic Baths, Women's Floor, Men's Lounge, etc.—and the earnest endeavor of a hotel organization intent on making your stay enjoyable.

Do not fail to visit New York's most notable hotel.

Management of MERRY & BOOMER

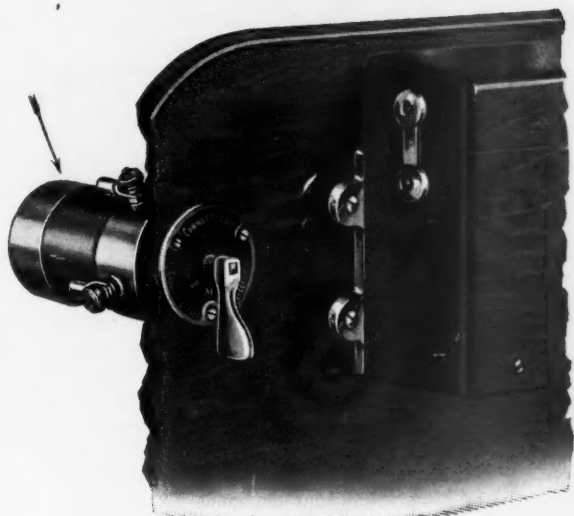
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Herald Square

NEW YORK

Nearer than Anything to Everything



Master Vibrator For Ford Cars

Fits flush with the dash and does not detract from its trim appearance.

Small, neat, compact—this efficient, alternating current master vibrator draws minimum current from the magneto.

This special vibrator insures easy starting—increased power, a smooth running engine—freedom from frequent adjustment of coils.

Install one of these special vibrators on your Ford car and obtain real magneto service at lowest cost.

PRICE \$9.00

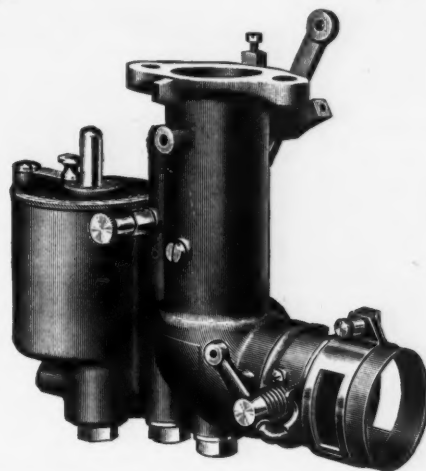
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Write for Bulletin No. 36.

Connecticut Tel. & Electric Co., Inc.
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made the greatest step forward in carburetion since Krebs' early device when the Zenith was invented. And like practically all great inventions it was achieved by an amateur who started with an unbiased mind and applied common sense to the fundamentals of carburetion. Baverey's principle of "the compound nozzle" has made history.



The Endorsement of Europe Today 125,000 Zenith carburetors are being used in high grade foreign cars alone. Factories in France, Germany and England are supplying over 150 concerns—names known around the world as Europe's best. At the recent London Show 41.5% of all cars exhibited were Zenith equipped. At Paris, 46%—nearly half of all—carried this device of high efficiency. Europe's sanction comes slow—but means much.

The Carburetor with Simplicity is the constant thought of American Engineers. The Zenith contains no moving parts, no valves, no springs. Once properly set, it has no wear and cannot be altered by the novice. It outlasts the car. Already eight well known American cars have chosen the Zenith above all as their standard equipment. Many more will follow as they test this famous device which for speed, for economy, for great flexibility is supreme. Science has given it the compound nozzle. Why not write for details?

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CARBURETOR CO.
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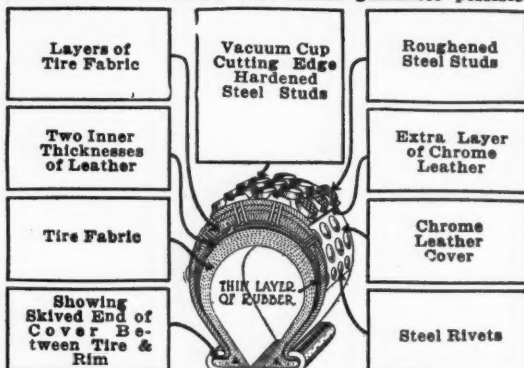


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PUNCTURE-PROOF
PNEUMATIC TIRES**

GUARANTEED FOR 10,000 MILES

Puncture-proof—Blowout-proof—Skid-proof—Rut-proof—Rim-cut-proof—Oil-proof and most resilient

This shows construction that makes guarantee possible.



A written 10,000 mile guarantee accompanies every tire.

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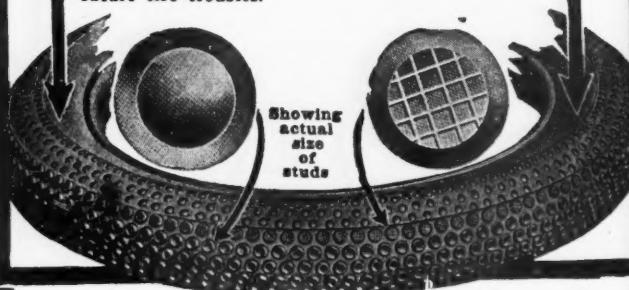
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BEFORE WE PLACE AN AGENCY WE WANT a set of these Britson Tires in each town—who will be the first one to order?

We can rebuild your tires like this

If you are not in need of new tires and the fabric in your present tires is still good, we can rebuild them the Britson way, making them puncture-proof—non-skidding—blowout-proof—and oil-proof and rim-cut-proof.

All the weak points in previous tire construction have been eliminated in the building of the Britson Pneumatic Tires. No motorist can afford to pass by the opportunity to be relieved of all future tire troubles.



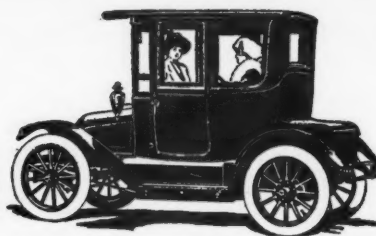
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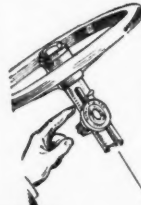
SERVING a distinct need, Buffalo Electric stand alone as the town car. Their claim to the place they occupy is based upon exclusive features—three point motor suspension—direct drive—noiseless running and the wonderfully simple foot control.

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FORGET THE
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**The Motsinger Carburetor
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Motsinger
Carburetor increased mileage guaranteed

Before you have your car overhauled this spring, investigate the MOTSINGER.

Write for interesting literature describing how and why we can guarantee the MOTSINGER to pay for itself.

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MIXTURE HERE**

Then instruct your repairman to install a MOTSINGER. If it doesn't increase your mileage—we take it back—refund its full purchase price. You can't lose. Write us.

Motsinger Device Mfg. Co.

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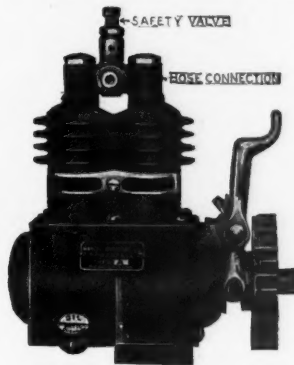
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WITH PURE AIR WITH THE

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Insist on THE MANZEL on your new car.

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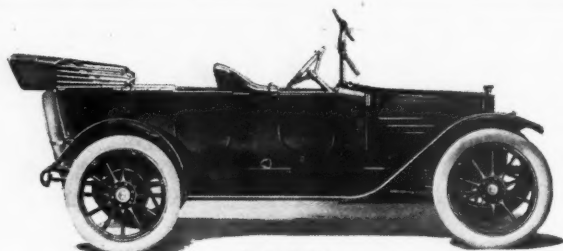
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Axle—Floating on Roller Bearings.

Transmission—Three speeds ahead and reverse.

Clutch—Multiple disc.

Control—Center.

Speedometer—Stewart.

Tires—34x4.

Wheel Base—116 inches.

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We are now ready to contract with good, reliable, live, wide-awake dealers and distributors on this greatest of all lines

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Clutch—Multiple disc.

Control—Center and left hand drive.

Speedometer—Warner, flush.

Tires—35x4½ and 36x4.

Wheel Base—132 inches.

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Rims—Demountable.

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The Brown Jr. Tire Pump Complete With 10 Feet of Woven Air Hose Tested to 500 lbs. Pressure.

If you own a Ford or any other small car, you can't afford to break your back pumping up the tires.

The Brown Jr. will do the work for you more quickly and better than you can do it by hand.

Made of the same materials and on the same mechanical principles as the Brown Impulse Tire Pump, which is making good for more than 60,000 automobilists. Don't forget the price, \$7.00; \$8.50 if you want a Brown Q. D. Spark Plug and connections.

Write us or ask your dealer concerning this latest sensation.

THE BROWN COMPANY
120 Bellevue Syracuse, N. Y.

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Our New 1914 Model "T" FORD Special Master Vibrator At \$10.00 and Our Senior Master Vibrator



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100% Thermoid is brake lining which can be relied on till worn paper-thin.

Engineers Say This Piston Ring Is Mechanically Perfect



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The latest improved piston ring on the market. Made in 3 pieces. All joints automatically sealed when the ring is placed on the piston. Adapted to automobiles, motor boats, steam engines, air compressors, etc.

STA-TITE Perfect Compression Piston Rings make new cars run better, and old cars run like new. With STA-TITE Rings on your motor you get perfect compression. That means full horsepower transmitted to the drive shaft.

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Liberal terms to supply houses and repair shops.

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"It's an absolute impossibility to 'open up' a plant and immediately deliver efficient gear assemblies.

"It takes time and experience—especially experience,—to enable a concern to ship really dependable parts.

"This is an undisputable fact, no matter what the business happens to be.

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"And listen, what is more, we've been pleasing them in every particular.

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"Looks as if we ought to be able to please you too."

WARNER GEAR CO. MUNCIE-IND.

DETROIT OFFICE—628 FORD B'LD'G.

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"Always There"

Ignition Service

It Doesn't Matter what brand of ignition your automobile is equipped with—**SPLITDORF SERVICE** is AT YOUR COMMAND. The whole SPLITDORF organization is YOUR FRIEND—we want EVERY user of a hydro-carbon engine to be OUR FRIEND. We'll leave no stone unturned to bind the friendship with TRUE SERVICE.

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FACTORY: NEWARK, N. J.

ROFFY AUTOMOBILE LAMPS



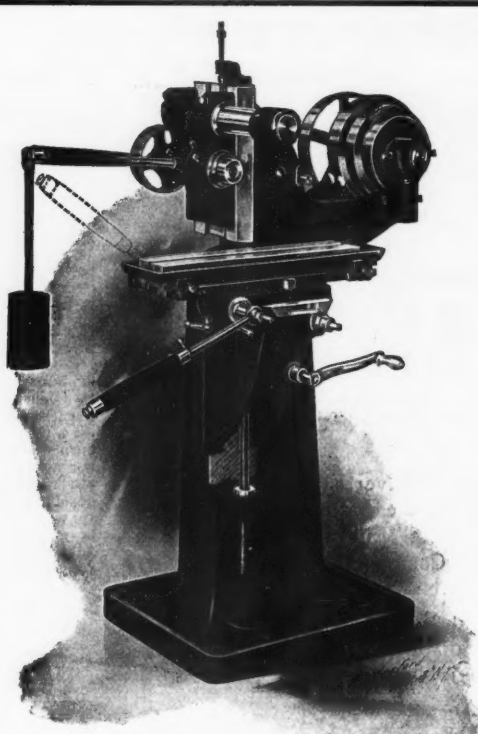
**Throws All the Light
Below the Radiator Absolutely
Without a Glare**

You often wished for a lamp without a blinding glare that gave a perfect and strong light—a lamp that was equally efficient for both city and country use? Here it is.

The ROFFY automobile lamp is built in tubular shape. It projects, through accurately ground lenses, a powerful beam of pure white light that illuminates the road better than any headlamp made. Never throws the rays over 4½ feet from the ground and cannot glare. The ROFFY ACHROMATIC LAMP can be used as both headlight and sidelight. Easily and quickly attached to front of radiator. For electric lighted cars only.

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"Whitney" Hand and Weight (Feed) Milling Machine
For Cam Cutting, Gear Cutting, Key Seating, Profiling, Slabbing, Slotting, etc. This machine is the handiest, most adaptable and most efficient on the market.

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**MASTER VIBRATORS
ROAD SMOOTHERS
AUTO LOCKS**

TEN REASONS WHY EVERY THIRD FORD

is equipped with a

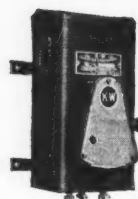


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It gives

More Power—A Hotter Spark
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One adjustment instead of four
No Worry
Uses less gasoline
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Price
\$16.00
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Autolock
Pick-proof
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Kick Switch

Only one adjustment. It takes the place of 4 separate vibrators in your coil, giving you one fast vibrator and a powerful condenser, which insures absolute synchronism. No change in the car necessary.

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The K-W Autolock Switch can be installed on your Ford car in five minutes—absolutely prevents theft—and costs but \$3.50. Write for folder.

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SPARK PLUGS**



\$5 and Immortality

The Lincoln Highway will last as long as the American Nation lasts. Every generation of Americans through all time to come will look back in grateful remembrance to the present generation which is building the Lincoln Highway. Thus do we, the builders, become immortal.

The most famous road in the world is the Applan Way, built by the Romans 2000 years ago. Compared to the Lincoln Highway, that road is a schoolboy's path. The Applan Way extends a short distance through the Italian peninsula. The Lincoln Way stretches for more than 3,000 miles from coast to coast, across the richest continent on earth.

The Applan Way has long survived the Romans themselves because they didn't know how to build their government on foundations as solid as they built their roads.

Over the Applan Way Roman generals, in their barbaric triumphs, led men and women in chains, enslaved forever. Along the Lincoln Highway all who travel shall be forever free.

For this Highway is a monument to the Great Man who held the American House together while he set under it a new foundation of liberty and equality to all on which it may endure.

Send \$5 today and get the Highway insignia for your office and your family vehicle. Send \$5 whether you own a motor car or not. This road isn't for motorists only—it's for all the people and all the people ought to build it. Send \$5 today—TODAY.

Pennant illustrated is in four colors, 36 inches long, at \$1.00 per pair (rights and lefts). Decorate your car and BOOST.

The Lincoln Highway Association, Detroit, Mich.

Space contributed by MOTOR AGE.
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V-Ray Spark Plugs

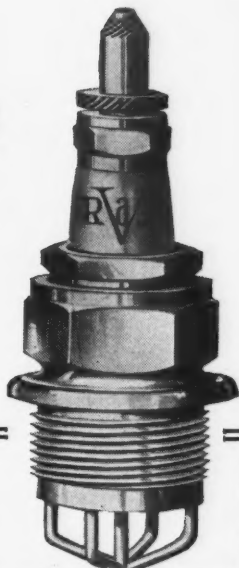
Possess a superiority that has never been questioned; cannot be injured by heat or oil

Sold with a Guarantee

V-Ray		"Mika"
Porcelain		SPARK PLUG
SPARK PLUG		SPARK PLUG
\$1.00		\$1.25

For Sale by
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ALL DEALERS**

**The
V-Ray Company**
MARSHALLTOWN, IOWA



*Give More Power
on Less Gas*

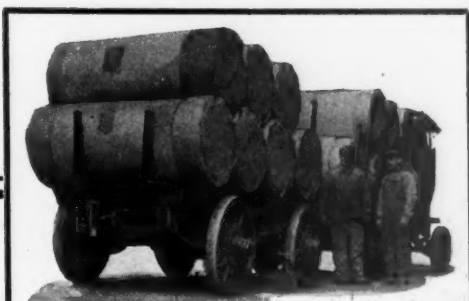
9½ Tons Per Trip

This 5 ton truck delivered 4½ to 5 tons per trip—when it worked alone. Now it delivers 9½ tons per trip—with a Troy Trailer.

How about your work? Troy Trailers will at least double the earning power of your truck on long or short hauls.

Get Bulletin M. and find out all about the TROY, and what it can do for you.

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We've cut the price of Positive Portable Steam Tire Vulcanizers from \$5.00 to \$3.50—and build a better vulcanizer! To sweep unworthy competition from the field—competition that was hurting the entire industry, we have cut the price \$1.50.

They can build a poor vulcanizer to sell at a cheap price, but they can't build a good vulcanizer to sell at a low price. You are the gainer from our action, Mr. Motorist. At \$3.50 this wonderful steam vulcanizer is the biggest value offered in the automobile field today. Pays for itself over and over again in one season. A complete outfit, including scissors, measure, repair gum and tube stock, with every

Dealers: If you want to cash in on this economizer, write us quick. Price so low, the Positive Portable Steam Vulcanizer sells like hot cakes.

Positive Portable STEAM Tire Vulcanizer

The only portable tire vulcanizer of its kind utilizing steam, the only scientific vulcanizing agent! Mends cuts, holes, punctures in tube or casing from size of nail to 2½ inches in diameter, or larger by resetting. Makes repair a veritable part of casing itself.

20 Minutes Turns the Trick!

No dilly-dallying around! No uncertain results! All you do is apply gum rubber—clap on vulcanizer filled with water in one end, gasoline in the other—and touch your match! 20 minutes after, your casing (or tube) is as good as new. And you've done what others would charge from \$2 to \$6 for, and do NO BETTER. How long do you suppose it would take such a money-saver to pay for itself! It does it many times over in a single season! Kerosene and alcohol can be used in place of gasoline for fuel.

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442 Rock Island St., Davenport, Iowa



MAYO SPARK PLUG PUMP

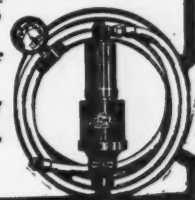
Adaptable to all size cars. Instantly attached by substituting for any spark plug. MAYO Quick Detachable Spark Plug may be used if desired. Pumps pure, fresh air only. Inflates largest tire in from 3 to 4 minutes. Built with metal rings like a motor and will last as long. Weight, 2½ lbs. An occasional drop of oil the only attention it requires. Price complete, with pressure gauge, 12 ft. hose, all connections—\$10.00. Quick Detachable Spark Plug, \$1.50 extra.

COMPLETE
WITH GAUGE

\$10

Try One Free on Your Car for
30 Days. Write Us.

Mayo Mfg. Company
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"The Wizard of the Hills"

It sells of itself and by itself as a Motor Car in which there are units of value to the full amount of the purchase price.

Our thoroughly tried and proved-efficient selling campaigns bring the prospective purchaser to your door.

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Tire Pumps

The name "Bridgeport" on a pump is a guarantee of the highest quality and finest workmanship. Simplicity of construction, extreme durability, air-tight pump connections—these features mark every "Bridgeport" pump.

The "Stapley" is the best-known. Its excellence of construction, backed by our extensive advertising to the car owner, makes it the most popular on the market. You can sell it easily.

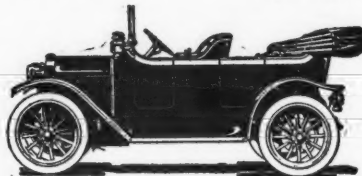
List prices—\$4.00 without gauge; \$6.00 with gauge. Your jobber can supply you if you have none in stock.

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GUARANTEED TO MAKE YOUR FORD

The Easiest Riding Car in the World

Could we make a stronger guarantee? And notice it is not a mere claim—it is a positive guarantee.

WHY? Because ACME TORSION SPRINGS are based on SCIENTIFIC PRINCIPLES, properly applied. ACME TORSION SPRINGS, the only practical device on the market that can act FREE with, and CONTINUOUSLY IN CONJUNCTION with the LEAF SPRINGS, any way they are called upon to work, and adjust themselves MECHANICALLY to all conditions.

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Insurance for life of occupants, car and easy riding. Don't be fooled by "shock absorbers." What you want is more spring capacity under proper Automatic Control. Acme Torsion Springs add at least 18 feet to the total leaf spring area, every inch adding greater resiliency automatically controlled.

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Has been adopted by these exacting manufacturers, whose cars are listed below—because Remy products have proven themselves 100% efficient.

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Remy Country-wide system of service stations is a valuable sales asset to you.

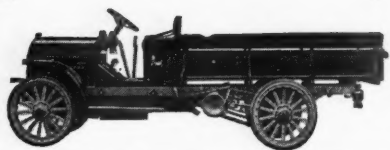
Modernize Your Old Cars—Investigate our Exchange Proposition.

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The tread that makes the brake effective

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Large
Bearings
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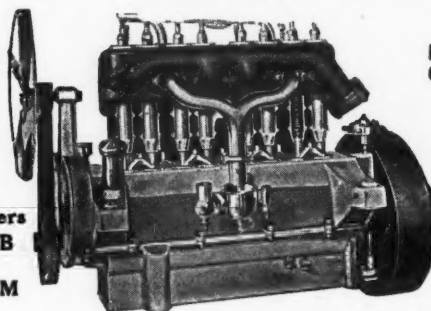
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MODEL B

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High Grade 4
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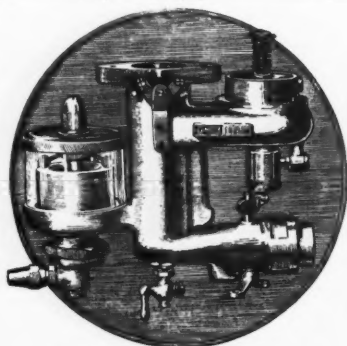
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and standard
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and trucks,
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make of car-
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A STROM-
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Money back if not satisfactory. Postpaid on receipt of price.
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SHARRER ONE HAND TOP



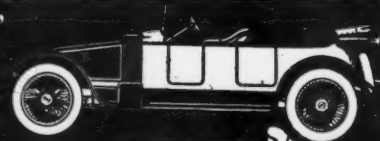
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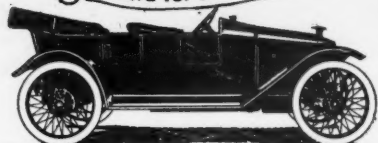
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A MODERN CLASSIC Price, \$2,350

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SMOOTH—QUIET—POWERFUL

Model 7, \$1250

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Steel MOTOR TRUCK LAMPS

C.T. Ham Mfg. Co., Rochester, N.Y.

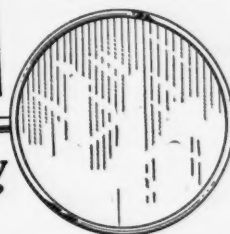
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Fits Any Ford Wind Shield
Every Ford Owner Should Have One

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\$3.00
All
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Eliminates all chance of accidents from rear end collisions, backing down embankments, etc. Pays for itself every day in the year. Made in 8" circle, finished in black enamel or nickel. The all nickel is built specially for Ford Cars. Money back if not satisfied. Agents wanted.

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For sale by Jobbers, Dealers, Garages, or

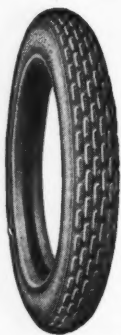
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Republic Staggard Tread, Pat. Sept. 15-22, 1908



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E. W. Austed

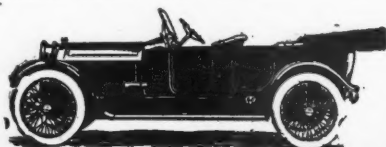
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More Power
More Flexibility
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Four-cylinder,
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50 horsepower,
128-in. wheelbase.

Bosch ignition,
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The car of the future will not have poppet valves
Moline Automobile Co., East Moline, Ill.

"THE TUGBOAT OF LAND COMMERCE"

SOLVES THE
HEAVY TRUCKING
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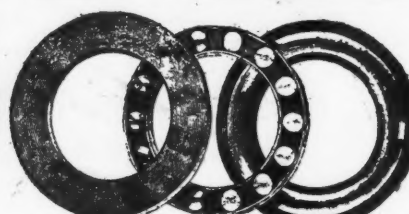
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**MARTIN
TRACTOR**



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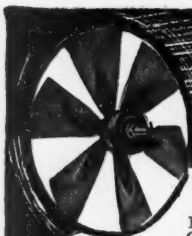
KNOX AUTO CO., SPRINGFIELD, MASS.



COMPLETE THRUST BEARING

The Star Ball Retainer Co.
Lancaster, Pa., U. S. A.

Manufacturers of Radial Ball Retainers, Thrust
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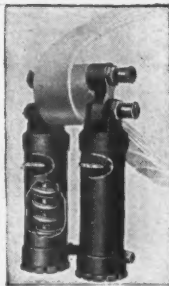
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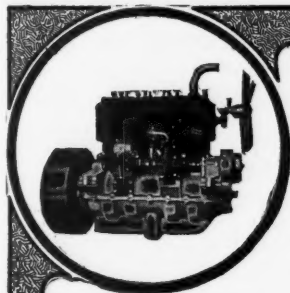
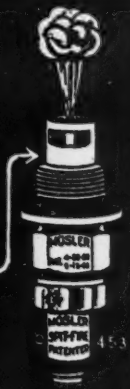
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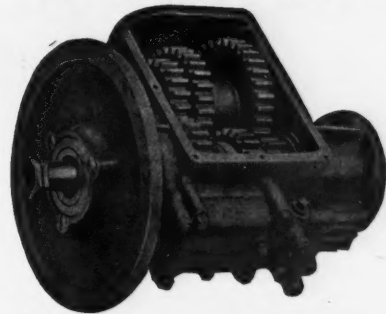
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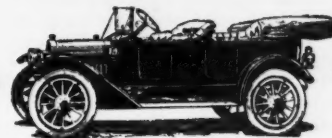
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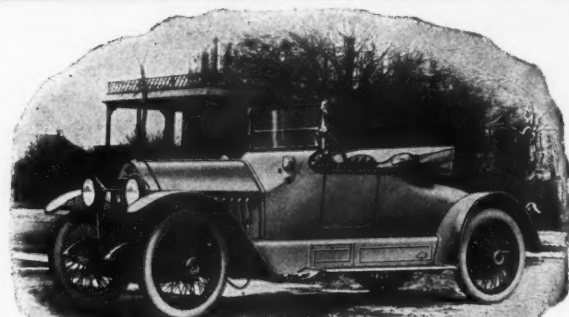
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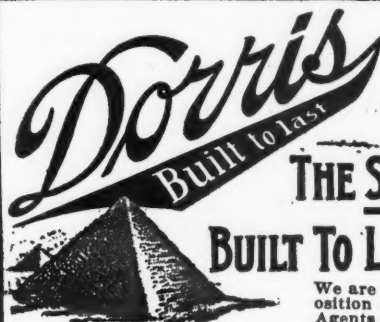


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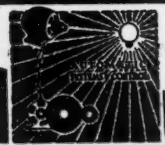
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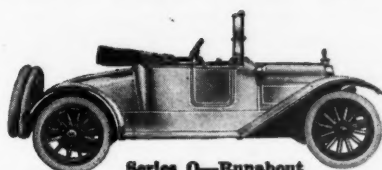
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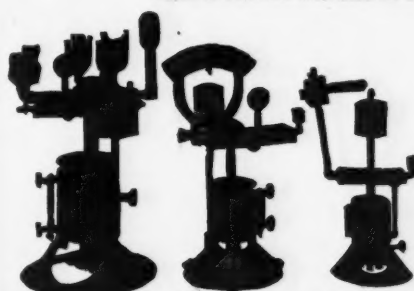
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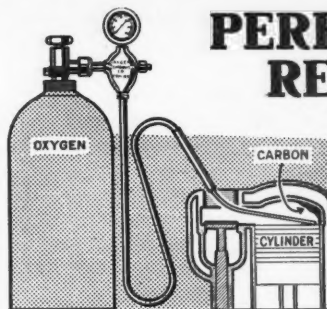
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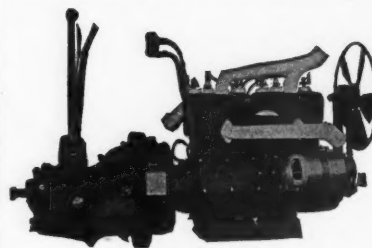
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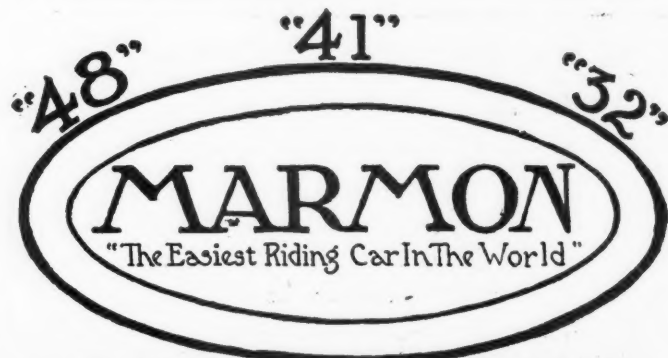
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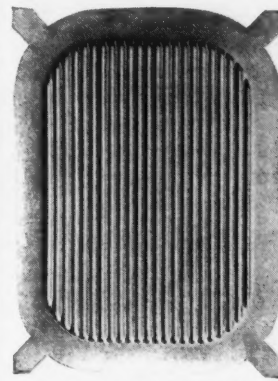
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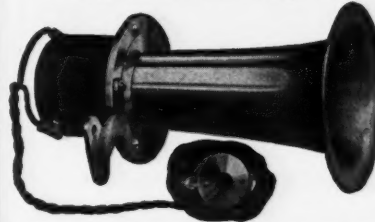
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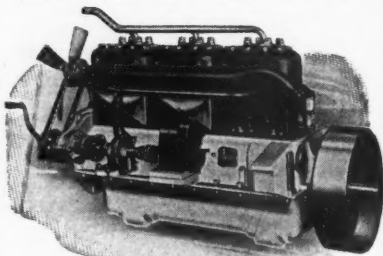
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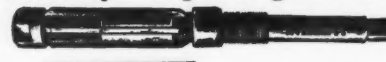
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1914 New Ford T Roadster Bodies With
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Write for this quick.

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This radiator will properly cool any Ford
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Waterproofs leaking tops and makes old tops like new. Sold by garages, dealers and jobbers.

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Makes all faded, stained and spotted linings a black uniform color. Makes old linings like new. Ask your dealer.

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NEW FORD TOURING CAR BODY WITH
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Brightens and renews all leather seats and cushions. Will not wash or rub off. Dries in twenty minutes. Ask your dealer.

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A black enameled lamp with one coat. Not affected by heat or cold. Does not crack, chip or peel. Made in either a gloss or dull finish. Ask your dealer.

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NEW.	NEW.
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Buick 10, 14, 32, 33.....	22.00
Hudson 20.....	28.00
Hupp 1910-1911.....	27.00
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All other makes at equally low prices. Send us your old radiator for repairs or exchange on a new one.

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Every car should have a radiator cover in cold weather.

Write for prices.
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RADIATORS THAT COOL THE MOTOR
and give satisfaction are W(RIGHT).
Built for all cars. We have in stock—
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Most accidents are caused by "cloudy" glass fronts. Our patented glass front cleaner removes rain, snow and "breath-steam" from windshield instantly. Made of brass; cannot rattle; always ready; operates from driver's seat. Send two dollar bill for one today and be safe. Tomorrow you might have accident costing two thousand, maybe life. **MARSHALL, WALTER & CO.,** Milwaukee, Wisconsin.

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START LITE GAS LIGHTER.

Light your gas lamps instantly from driver's seat without stopping. Regular price, \$15.00. Our price, \$8.00 complete.
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Our gasoline gauge tells you exactly the amount of gas in your car. Just state car. Put 15c in stamps in envelope and mail. Sent prepaid. 126 Erie St., Toledo, Ohio.

STOP THAT LEAK IN YOUR RADIATOR
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Patented lock for Ford and other small cars. Impossible to start motor. Two keys with each lock. Sent prepaid, \$1.50. May save price of your car.
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Seats, special and stock sizes. Radiators, hoods, tanks and fenders for any car. Get our prices.

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200 in use in St. Louis. Prevents sagging and breaking of rear axle. Takes ten minutes to apply. Best on the market. Guaranteed two years. \$2.50 prepaid.
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For dusting and polishing automobile bodies, windshields, lamps, pianos or any other polished surface. House Size 25c. Automobile Size 50c. Sent to any address upon receipt of price. If not satisfied, return duster and we will refund purchase price.

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Polish your nickel and brass the E Z way with

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Manufacturers of Portable (weight 40 lbs.) and stationary welding, cutting or lighting plants; supplies of all kinds. Agents wanted. Fulton & Enfield St., Brooklyn, N. Y.

WE HAVE JUST TAKEN IN EXCHANGE
2-ton Saurer chassis in fine condition. 4 speed transmission direct on 3d, 4 cyl. long motor. Bosch high tension magneto. Condon, 2635 Wabash Ave., Chicago.

WE HAVE SEVERAL SLIGHTLY USED
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(TOWNSAN VALVE ADJUSTER AND SILENCER) A (FORD) SPECIALTY, COMPRISING A SPRING CYLINDER AND THIN STEEL DISKS WAS ISSUED JAN. 27, 1914. JOBBERS AND DEALERS ARE WARNED THAT WE SHALL PROTECT OUR INTERESTS. SUIT WILL BE INSTITUTED AGAINST MANUFACTURERS ILLEGALLY MAKING THIS DEVICE.
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WE MAKE FORD RACING TYPE BODIES
in several models for immediate delivery.
AUTO SHEET METAL WORKS.
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WE TEAR 'EM UP AND SELL THE PIECES

We want old autos, condition no object. We will buy anything for the auto. We have all kinds of parts, many of them new, at unheard of low prices. Tires and tubes, many new, others used. Kingston carburetors, all sizes; will exchange for others. Gears of all kinds, new gas oval tanks, new timers, magnetos, coils. Stewart speedometers, shafts and chains, tire covers, dust hoods, electric horns, new brass bumpers, lamps, all kinds, Prest-o-Lite tanks, oilers, cylinders, pistons, transmissions, crankshafts, seats and bodies; new 30x3½ wheels, many other used sizes; rims; several chassis without engines, 2-cylinder, 4-cylinder, 6-cylinder engines, springs; in fact, everything that an auto needs. Correspondence solicited. If we do not have it, will advise you where you can get it. Anything bought can be returned at once, unused, carriage prepaid and we will refund amount paid.

AUTO WRECKING CO.,
Old Church, 13th and Oak,
KANSAS CITY, MO.

WESTON MOTT HIGH GRADE REAR
axles, \$45.00. Other bargains, too.
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WHEN BUYING FORD SPECIALTIES,
look for the APCO on the box. If you see this trade mark, you are safe in every way, for it means "Every sale a sale of satisfaction." Your money will be cheerfully refunded if you are at all dissatisfied. The APCO goods cost you no more, so insist and don't let your dealer sell you "something just as good" and on which all sales are final. He makes more money, but where do you get off? Remember if your dealer won't refund your money, we will. You buy APCO and let the other fellow get the imitation.
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The originators and largest manufacturers of Ford Specialties in the world.

50 NEW PRESSED STEEL FRAMES, 163"
long, 34" wide. Each, \$10.
Send for sketch.
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STEERING KNUCKLES, YOKES, FRONT
axles, springs, wheels, and friction transmissions.
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AUTO WANTED—WILL LOAN YOU
money on your car or sell same. American Storage Co., 5025 Wabash Ave., Chicago, Ill. Phone Midway 3233.

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Minn. at \$20.00 a.; improved A1 land. Will take small auto as part payment. E. H. Keller, Marshalltown, Ia.

TO TRADE—VACANT LOT, GOOD LOCA-
tion, or \$550 electric piano for Ford run-about, 1912 or 1913 model.
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WANTED—SECOND GARAGE EQUIP-
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C. P. Buswell, Meriden, Iowa.

WANTED TO BUY—PREST-O-LITE AND
other make gas tanks for cash. Walter R. Ebert, 959 34th St., Milwaukee, Wis.

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A NO. 1 REPAIR MAN; 7 YEARS GARAGE
and factory experience; college graduate with tools wants steady work in well equipped garage. Address, Box 262, Abingdon, Illinois.

AN EXPERIENCED BODY BUILDER DE-
sires position as foreman or superintendent; good organizer and reliable; can furnish best reference as to executive ability.
Box E 46 c/o Motor Age

EXPERIENCED SALESMAN HAVING
eight years experience selling automobiles desires to connect with a distributor who would appreciate the services of a business producer. All references. Address Box E 17, c/o Motor Age.

I KNOW TRUCKS.

A Mechanic wants position where motor transportation is not satisfactory or about to be installed. Box E 35, care of Motor Age.

POSITION AS CHAUFFEUR. PARTIES
desiring sober, reliable man, 5 years experience, drive or repair any make. Furnish best of reference. Touring preferred. Unmarried. Address C. E. T., Box 113, St. Elmo, Ill.

POSITION AS FOREMAN IN MODERN
garage after April 1st. Single, American, age 30; 12 years repairing and running automobiles. Temperate. References. M. C. Hoyle, Lock Box 36, Warren, Mass.

POSITION WANTED—SUPERINTENDENT
or assistant; 20 years of practical mechanical experience; 12 years executive; thorough knowledge of piecework and premium systems; a hustler and has always been very successful in getting results; at present employed in responsible position. Address Box E 25, c/o Motor Age.

SITUATION WANTED—TEN YEARS EX-
perience on truck and pleasure car, as superintendent or general foreman. Address, Box E 44, c/o Motor Age.

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SALESMEN DESIRING A FINE, QUICK-
selling, profitable side line, should address
GATES MFG. CO.,
Indianapolis, Ind.

SALESMAN FOR CITY OF 100,000 AND some territory work. Good selling line thoroughly advertised. Exceptional proposition to real salesman. Order takers need not answer. Address Box E, 33, c/o Motor Age.

SALESMEN WANTED FOR QUICK SELLING automobile and hardware standard specialties; exclusive territory to live men. Motor Parts Co., 229-231 W. Erie St., Chicago, Ill.

"SALESMEN WANTED—TO HANDLE AN excellent side line to the Garage and Motor Accessory Trade. Not a proposition for jobbers. A large company with an established reputation and with an advertised line can use a number of men. State line you are handling now, territory covered, references and consent of other houses represented required. Give full information. Address, Gelhaus, 410 New St., Cincinnati, O."

TRAVELING SALESMEN
Side line. I manufacture an article that sells to every repair shop and garage.
D. Ogden, Columbus, Ind.

WANTED—Salesmen, both traveling and local, superintendents, designers, draftsmen, engineers, desiring to be placed in touch with high grade positions with automobile factories, and who can hold such positions down, should write immediately to The Michigan Co-operative Co., 1532 Dime Bank Bldg., Detroit, Michigan.

WANTED—A "FIRST-CLASS" REPAIR man in garage, located in western Ill.; must be familiar with wiring and lathe work; state whether married and age, also what wages you demand, with A1 references. Address Box E 39 c/o Motor Age.

WANTED APRIL FIRST.
Competent general repair man for steady position. Give references and full particulars as to experience and wages expected.
Fredericksburg Auto Co.,
Fredericksburg, Iowa.

WANTED—AUTO ACCESSORY SALESMAN to carry our line either as a complete or side line. Offer an attractive proposition in any state. Box E 18, c/o Motor Age.

WANTED—BY THE LARGEST MANUFACTURERS and jobbers of Auto Accessories in the United States, auto accessories salesmen for traveling positions in middle western states on assigned territory. For those whose past records will stand investigation, and who have made good in selling automobile accessories, future prospects are very bright. Only replies in which full details of past experience, references, age, nationality and salary desired are given will be answered. Address, Box E 42, c/o Motor Age.

WANTED — CARBURETOR SALESMAN and demonstrator. Must give best reference. Address Box E 34, c/o Motor Age.

WANTED—COMPETENT ALL AROUND automobile repair man to take charge of small garage. Must have a fair knowledge of electric starters. Married man preferred. State salary expected and give references. Address, Box E 43, c/o Motor Age.

WANTED—FIRST-CLASS AUTO REPAIR man and lathe hand. Steady job to reliable man. Address Box E 31, c/o Motor Age.

WANTED—FIRST CLASS AUTO REPAIR man and machinist; must be A1; steady job to right man; kindly state experience, age, and married or single. Address, Box E 41, c/o Motor Age.

WE ARE CONSTANTLY IN TOUCH WITH Employers requiring High-Grade Engineering service. Are you listed with The Toledo Engineering Agency, Toledo, Ohio?

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MAKE \$50.00 TO \$100.00 A WEEK SELLING the Doxameter, the only automatic guaranteed gasoline-saving device for autos and stationary engines. Saves 25 to 40%. Retail price, \$5.00. Send \$3.00 for sample and particulars. DOXAMETER SALES CO., 2132 S. Michigan Ave., Chicago, Ill.

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Exceptional commission.
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WANTED—AGENTS TO SELL PORTABLE Welding plants, Oxygen carbon removers, Electric horns, C-Well rear sight Mirrors, Skidoo Soap and Milwaukee Auto Specialty Co.'s line. Exclusive territory and liberal commission to the right parties able to devote their entire time to their sales.
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High-grade Agency is open for proposition as direct factory representative in Philadelphia and surrounding territory. Strong influence with trade. Located on Automobile Row. Address Box E 26, c/o Motor Age.

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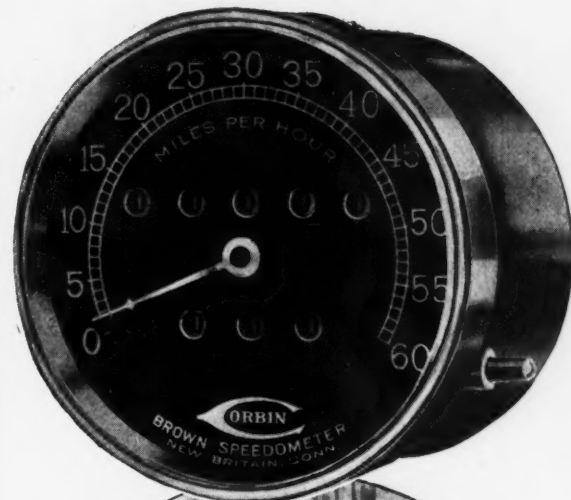
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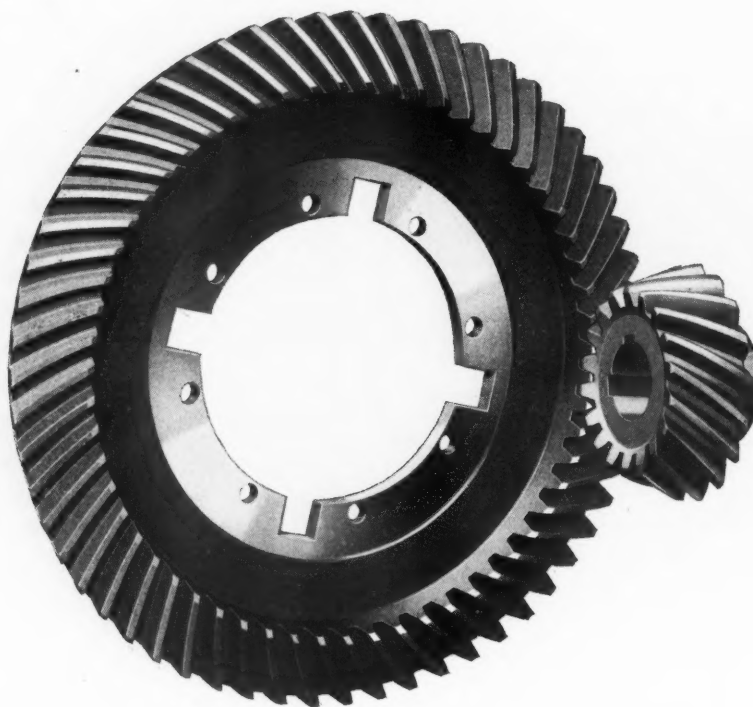
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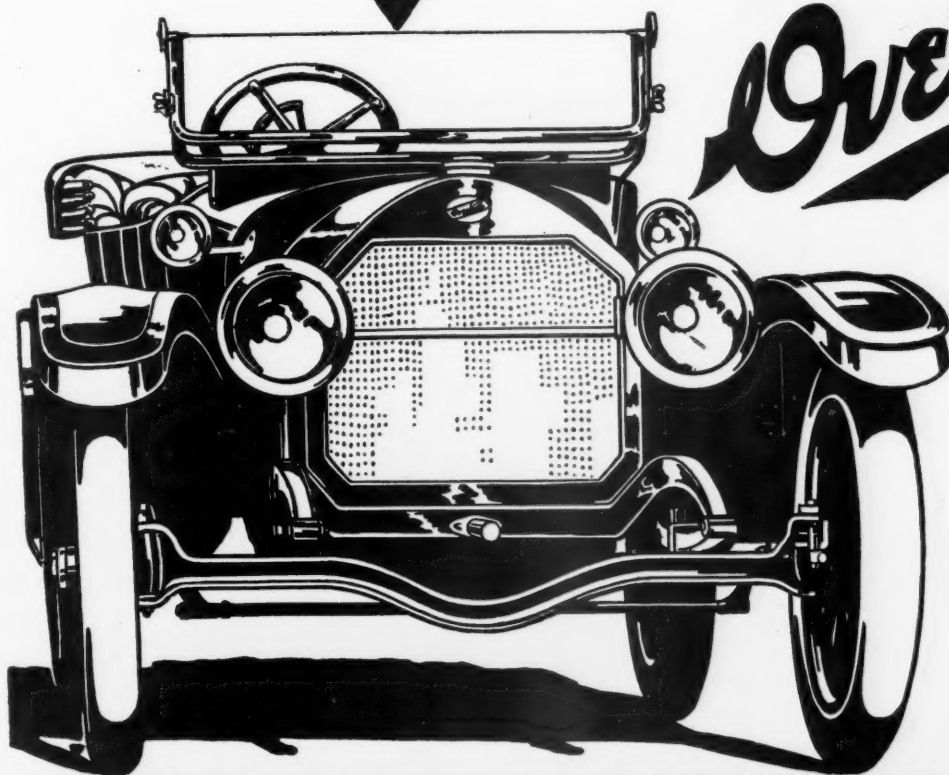


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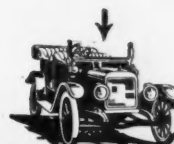
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